Architect of the Capitol
April 1997

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
	1 5

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
M001	**May 8, 2008**		

6. ISSUED BY	7. ADDRESS AMENDMENT/MODIFICATION TO
ARCHITECT OF THE CAPITOL United States Capitol Washington, D.C. 20515	Architect of the Capitol Procurement Division Ford House Office Building Attn: Chris Lindsay Room H2-263 Second and "D" Streets, S.W. Washington, DC 20515

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		(X)	9A. AMENDMENT OF SOLICITATION NO. RFP No. 080033
			9B. DATED (See Item 11) May 5, 2008
			10A. MODIFICATION OF CONTRACT/ORDER NO.
CODE	FACILITY CODE		10B. DATED (See Item 13)

SUBJECT: **MODERNIZATION OF ELEVATOR #1 AT THE U.S. SUPREME COURT, WASHINGTON, DC**

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of offers is extended, _ is not extended.
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and return ____copies of the amendment; (b) By acknowledging receipt of this amendment in Block 12 of Page 1 of the solicitation package, giving amendment number and its date; or ©) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. **FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER.** If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter make reference to the solicitation and this amendment, and is received prior to the opening/receipt hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT/ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor _____ is not, _____ is required to sign this document and return it to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION

1. SEE CONTINUATION PAGES.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR _____ (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA By _____ (Signature of Contracting Officer)	16C. DATE SIGNED

A. This Amendment No. 001 is issued to the provide Technical Specification Section 14212 **-** MODERNIZATION OF TRACTION ELEVATORS. This Amendment also changes to time and date of the site visit to **THURSDAY, MAY 15, 2008 AT 9:30AM.** All other terms and conditions remain the same.

Attachments:

Technical Section 14212- MODERNIZATION OF TRACTION ELEVATORS (45 pages)

Distribution:

Contract File
COTR -

SECTION 14212 - MODERNIZATION OF TRACTION ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY:

A. **Extent**: Provide all labor, materials, and equipment necessary for the modernization of one (1) existing passenger elevator number 1 located at the U.S. Supreme Court Building, 1st and East Capitol Streets NE, Washington, DC 20510-7218.

1. Provide all incidentals, not specifically listed, but required for safe and efficient operation of the elevator system or to comply with referenced codes.
2. Unless specifically stated otherwise, all existing elevator capabilities and functions shall continue after the modernization of the elevator.

B. **The work for Elevator No. 1 shall include,** but not be limited to, components utilizing the latest proven designs to accomplish the items below. Provide new the following, except where stated differently:

1. Replace car controllers and provide SCR Drives.
2. Replace all sheaves.
3. Replace car and counterweight buffers.
4. Replace hoist ropes and wedge sockets.
5. Replace car door operators, clutches, and hardware.
6. Provide a new connection and interface to the existing monitoring system.
7. Replace traveling cables.
8. Replace car and counterweight roller guide assemblies.
9. Replace governor and governor cable.
10. Refurbish Car Enclosure.
11. Provide car entrance detectors.
12. Provide a new car station and refurbish the existing car control station.
13. Provide Safety Device.
14. Provide car top control station.
15. Refurbish Hallway door frames, door bucks.
16. Provide new communications systems.
17. Provide hoistway door hardware.
18. Provide hoistway access switches.
19. Refurbish Guide Rails.
20. Refurbish Struts and Headers.
21. Refurbish Fascia, Toe Guards, Dust and Hanger Covers.
22. Refurbish the existing position indicators.

C. **Project Verification of Material Condition**: Coincidental with the progress of interfacing with various systems, all reused material associated with the interfacing shall be checked, modified, and repaired or replaced, as necessary to restore it to first class condition.

1. **The present machine rooms** will be retained. Provide all blockouts, cutting, patching painting and refinishing. Repair all surfaces disturbed by work associated with this

project and finish to match and blend with the adjacent surfaces. Paint all elevator-related equipment except the governors (see Article 3.6, Painting and Field Finishing).

2. **The present hoistways** will be retained. Patch and re-finish wall and/or ceiling damaged by removal of existing operating and signaling devices. Refinished surfaces shall match and blend with the adjacent surfaces.

1.2 **REFERENCES**:

A. **Regulatory Requirements:**

1. **Elevator Code:** Except for more stringent requirements as indicated or imposed by governing regulations, comply with applicable requirements of the following ASME standards:

   a. Safety Code for Elevators and Escalators ASME A17.1 (hereafter referred to as the "Code"). 2000 edition.
   b. Inspectors' Manual, ASME A17.2.
   c. Safety Code for Existing Elevators and Escalator, ASME A17.3.

2. **NFPA Code**: Comply with applicable requirements NFPA 70, "National Electric Code (NEC), for electrical work. 2005 edition.
3. **IEEE Compliance**: Comply with applicable requirements of IEEE Std. 241, "IEEE Recommended Practice for Electric Power Systems in Commercial Buildings" pertaining to wiring systems.
4. **American Disabilities Act (ADA)**: Except as otherwise indicated, comply with "American Disabilities Act" (ADA) (Fed. Reg./Vol. 56, No. 144/Part 36), including clearances, mounting heights, lighting, color/tactile requirements, control and locations for signal equipment, door timing cycles, and similar provisions.

1.3 **SYSTEM DESCRIPTION**:

A. **General:** Design system to meet performance requirements stated in the Elevator Schedule at the end of this Section and summarized below. The elevator shall have the capacity to lift a live load (exclusive of the weight of the car and cables) at the speed in feet per minute as specified in the Elevator Schedule:

1. **Contract Speed**: +/- 3% of rated speed under any loading condition. Rated speed shall mean speed in either direction of travel.
2. **Contract Capacity**: Safely lower, stop and hold up to 125% of rated load.
3. **Stopping Accuracy**: Adjust each elevator to provide accurate leveling within +/- 1/8" of the floor level under any loading condition without re-leveling.
4. **Door Opening Time**: Seconds from start of opening to fully open:

   a. Elevator 1: 2.0 seconds

5. **Floor-to-Floor Performance Time**: Seconds from start of doors closing until doors are 3/4 open and car level and stopped at next successive floor under any loading condition or travel direction:

   a. Elevator 1: 11 seconds

6. **Passenger Waiting Times**: Passenger waiting times in the elevators are measured by registration of hall calls, and shall meet the following minimum criteria during the traffic conditions of the day other than "up-peak." The requirements are predicated on not more than 150 calls being registered within the designated 15 minute period, and all cars in the group being used for passenger service during this period. Waiting time for service at floors not served by all elevators shall not be included in the verification of waiting time performance.

   a. Average of all hall call waiting times in any 15 minute period shall not exceed 20 seconds.
   b. 75% of all hall calls registered in any 15 minute period shall be answered within 30 seconds of registration.
   c. 90% of all hall calls registered in any 15 minute period shall be answered within 60 seconds of registration.

1.4 **SUBMITTALS:**

A. **General**: Submit product data, samples or shop drawings for all material/equipment to be furnished as part of the work in accordance with Conditions of the Contract and Division 1.

1. **Number of Items to be Submitted**: Unless stated specifically elsewhere, deliver four (4) sets of each item below.

   a. Where it is stated below that " before completion of each elevator or first elevator of a group", this is to be interpreted to mean: When the first elevator of a group which will be wired and controlled "exactly" the same as the rest of the group; then one set of these submittals will be allowed for that group as long as the submittal addresses in the title and boldly on the each page all the elevators covered by these drawings or diagrams. Any elevator of the group addressed which has any deviation from the group (i.e speed, size, capacity, service, landings, etc.) shall require an additional set of submittals.

B. **Product Data**: Provide manufacturer's detailed technical product data and installation instructions for all equipment. For each elevator unit, indicate capacities, sizes, performances, operations, safety features, finishes, and similar information. Indicate any variations from specified requirements. Submit MSDS for all paints and chemicals used in project.

C. **Drawings**: Within fourteen (14) working days of "Award of Contract," provide layout drawings, accessory and fixture drawings, and details for review. Dimensioned drawings (developed from field measurements taken by the Contractor), shall show elevations and details of machines, car enclosures, hoistway entrances, vertical hoistway and plan views. Include complete drawings of the elevator, hatchway, and machine room indicating details of design and fabrication of door details with accessory and fixture drawings, and details. Use standard architectural scales for all drawings.

1. Provide “As-Built or Installed” drawings in final submittal phase.

D. **Samples:** Within twenty-one (21) working days of “Award of Contract,” provide minimum 12" x 12" samples of all exposed finished items for approval. Provide samples of equipment/material as outlined in this Section

E. **Wiring Diagrams**: Within ten (10) working days of delivery of the controller to the site, provide wiring diagrams of the elevator showing the electrical connections of all elevator equipment in the hoistway and machine room for approval. Ten (10) working days before completion of the elevator provide complete sets of AS INSTALLED "single-line" wiring diagrams showing the electrical connections of all elevator equipment in the hoistway as well as the machine room. Two (2) sets of diagrams shall be reproducible polyester). Provide and continually update this set to reflect any changes made during installation and adjustments. These diagrams shall become the property of the Architect.

1. Wiring schematics depicting controller logic shall not contain any proprietary "black-box" functions that cannot be field-analyzed or verified during trouble calls or maintenance operations by Architect's personnel.
2. Encase two (2) additional sets of straight line wiring diagrams, reduced to a 24" X 18", in clear laminated plastic sheets (10 mil min. thickness), front and back, suitable for hanging on hooks in a machine room.
3. Isolate all safety devices in the safety string.

F. **Electronic Schematics**: Ten (10) working days before completion of first elevator, provide with the electronic schematics, all the necessary diagrams for trouble shooting, and a complete description of the operational characteristics of the program. The program shall be read and understood through the use of a data link to the dispatch MS/WINDOWS compatible computer, which will be part of the controller package. The program(s) shall keep a history of all recent events with which the controller is involved. The events include normal functions (use of elevators, availability, etc.), failures, personnel access and their actions. In addition to the legend information required for all shop drawings, provide the following:

1. Name and symbol of each component.
2. Location on drawings, drawing sheet number and area of component.
3. Location of apparatus whether on controller, selector, motor generator, starter, hoistway or elevator car.

G. **Maintenance Manuals**: Ten (10) working days before completion of first elevator or first elevator of a group, provide the following items organized into a standard binder, with a table of contents and locator tabs:

1. Instructions explaining all operating features including all apparatus in the car and lobby control panels.
2. Lubrication charts indicating all lubricating points and type of lubricant recommended for all equipment.
3. Parts catalogs for all replaceable parts. The parts catalog shall be comprehensive and show breakdowns of intricate equipment with part numbers and descriptions and shall provide generic replacement part numbers cross referenced to part, system, and subsystem.
4. Adjustor's manual, of the type utilized by Contractor's field adjustors in the calibration of the controller and door operator installed. Manuals shall contain step-by-step procedure

for field adjustment and calibration of all equipment, including any and all printed circuit boards. Include step-by-step sequence operation of the electrical circuitry from the initiation of a hall call through to the final stage of the elevator being ready to accept another hall call. This sequence of actions shall, clearly and concisely, refer to the straight line diagrams and mention each contact and/or device energized or de-energized.

H. **Electronic media submittal**: One (1) month prior to Final Acceptance, submit two (2) sets of the following in electronic media on clearly labeled CD-ROM. Each file shall be clearly described in an accompanying typed summary (index table) file which will include file name, size, and a short description.

1. Drawings: All single-line wiring diagram files (as-builts), layout drawings, and electronic wiring diagrams) shall be submitted in either MicroStation DGN, AutoCad DWG (2002 or earlier), CGM, or IGES format.
2. Text (Instructions, Manuals, etc.): Where the Contractor has converted product data, instruction handbooks, and maintenance manuals to electronic format, and if that material has been formatted in Word Perfect 10 (or newer) or Adobe .pdf format, submit copies of the referenced documents on electronic media. Any referenced text-based materials not converted to electronic format should be submitted by standard hard-copy methods. Photocopies are not acceptable.

I. **Scavenged parts** removed from the existing controllers, selectors and other equipment which are not declared surplus by the representative of the Architect shall be handed over to that representative for replacement parts for other existing equipment.

J. **Accessories:** Ten (10) working days before completion of first elevator, provide all special tools necessary for making all system adjustments to the signal and speed controller and door equipment. Deliver to Architect before acceptance test and inspection of first elevator to be turned over.

K. **Redundant Parts**: One (1) month prior to Final Acceptance, provide the following redundant equipment/parts, identical to those incorporated into the required work of this Contract. Deliver redundant parts to the Architect's representative prior to final acceptance.

1. Two (2) sets of car rollers and 2 sets of counterweight rollers of each type used.
2. One (1) complete set of each type circuit board used in the controller. Ship boards in containers which are thoroughly protected against damage to contents by water, x-ray, magnetic and/or physical or static shock. Clearly mark or identify each container as to contents and method of handling to minimize damage due to handling and storage. Install each board in an active elevator controller and demonstrate to the Architect that each board is functional.

    a. The "Mother Board" is not considered one of the boards to be supplied.

3. One (1) complete set of each type of vandal-proof button assembly.
4. Two (2) sets of each type of relay used.
5. One (1) contactor of each type used.
6. One (1) tachometer
7. Two (2) rollers for the tachometer
8. Two (2) sets of spare fuses for fused disconnect (lighting supply).
9. Four (4) replacement lenses per character for each position indicator.

L. Keys: Ten (10) working days before completion of the elevator, eight (8) sets of keys to operate all keyed switches and locks shall be furnished upon completion. Keys shall be properly tagged. All keying shall be coordinated with the Government. Provide keys as follows:

1. Firemen's Service	MFD-1
2. Access and Inspection	EPCO-2
3. All others	EPCO-1

1.5 **QUALITY ASSURANCE**:

A. **Installer Qualifications**: Either the elevator manufacturer or a licensee of the manufacturer who qualifies as a "Specialist" under the provisions of Division 1, GENERAL REQUIREMENTS.

1. Welder Qualifications: The Contractor shall qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure" and provide a current certification that welders employed in work specified have satisfactorily passed AWS qualification tests.

a. All welding shall be done by a certified welder. A copy of the welder's certification shall be a part of the submittal process.
b. Field welding in any portion of installation will not be permitted without prior approval of the Architect and an AOC-issued welding permit. Random torching and welding of structural members shall not be permitted.

B. **Standard Systems and Components**: Duplicate equipment, components, and devices shall have all parts which perform the same function manufactured to one design for each part, and each part shall be interchangeable with other like parts.

1.6 **DELIVERY, STORAGE, AND HANDLING**:

A. **Deliver material in manufacturer's original**, unopened protective packaging. The location of the inspection facility is: D.C. Village, 4700 Shepherd Parkway, Washington, D.C.; contact phone number is 202-226-0905.

1. All deliveries must be inspected off site and placed under Capitol Police seal.
   a. ***Hours of Operation:*** 5:00 AM to 2:00 PM, Monday through Friday.
   b. ***Required Data:*** Provide a letter to the United States Capitol Police, on company letterhead stationary accompanied by the signature of the owner, president, or manager. Letters shall be renewed three (3) times per year, by April 30, August 31, and December 31, and should contain the following information:

- Name of the Company
- Name of the drivers/employees requiring access.
- Social Security Number and Date of Birth for each driver/employee.
- Buildings to be accessed.
- Company contact person and telephone number.
- Provide information to:
  United States Capitol Police
  Operations Division
  119 D Street, N.E.
  Washington, DC 20510-7218
  FAX: (202) - 224-4505

2. All Contractors are to supply to the Architect a minimum of two (2) working days in advance of delivery. In addition to the above information, provide the following information for each vehicle making a delivery:

   a. Vehicle description(s), make, model, year, color and license numbers with State.

B. **Store material in original protective packaging**. Prevent soiling, physical damage, and wetting. Protect equipment and exposed finishes during transportation, erection, and construction against damage and stains.

C. **Limitation on the Use of the Site**: Portions of the building beyond the areas on which the specified work is indicated shall not be disturbed. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.

1.7 SEQUENCING AND SCHEDULING

A. **Sequencing**: The Contractor is to perform the work with the following target dates:

1. Elevator 1 shall be complete and operational by September 1, 2008.

B. **Double and 12 hour** shifts will be permitted; submit schedule for Architect's approval.

C. **Access to Work Area**: If the Contractor wants to work outside of standard working hours, a request shall be made at least five (5) working days in advance and shall include duration and location of work and the number of persons involved.

1. Contractor is required to accomplish all work that is noisy, and produces odors, smoke or other nuisances outside of standard working hours.

Standard Working Hours

Monday thru Friday 6:00 AM to 5:00 PM

1.8 **WARRANTY**

A. **Special Project Warranty**: Provide special project warranty, signed by the Contractor, Installer, and Manufacturer, agreeing to replace, repair, or restore defective materials and workmanship of elevator work during warranty period. This warranty shall be in addition to, and not a limitation of, other rights the Government may have against the Contractor under the Contract Documents.

1. **"Defective" is defined** to include, but not by way of limitation, operation or control system failures, performances below specified ratings, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration, and similar unusual, unexpected, and unsatisfactory conditions.
2. **Warranty Period:** One (1) year effective on the date of Final Acceptance for the elevator except the controller.
3. **Warranty Period** for the controller will be in effect for a period of fifteen (15) months from the date of final acceptance..

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B. **Warranties:** Provide coincidental product warranties where available for major components of elevator work. Submit with maintenance manuals.

C. **Warranty Response Communications**: The Contractor shall maintain an attended telephonic help-line which shall be available 24 hours a day, including weekends and holidays, for receipt of calls (e.g., emergency repairs) from the Foreman or Assistant Foreman of the Elevator Shop; the Jurisdictional Superintendent, his Deputy, or an employee of the Elevator Engineering Division. The Contractor shall provide the telephone number and name of the contact person prior start of warranty period. This requirement shall be in effect during the entire warranty period.

1. The Contractor shall acknowledge and be on-site within a two (2) hour period of receipt of a call between 5:00 a.m. to 10:00 p.m., Monday through Saturday. Calls received by the Contractor outside of this time frame requires him to acknowledge and be on-site within eight (8) hours of its receipt.

1.9 **COMMUNICATIONS AND CHECK-IN**:

A. **The Contractor** shall deliver to the AOC a local phone number which is monitored 24 hours a day, seven (7) days a week. A local phone number is defined as any phone number from which the Contractor's representative can respond from within the two (2) hour response time in the Contract.

B. **The Contractor**, upon entering the jurisdiction for any Contract related reason, shall proceed immediately to the elevator shop and sign in on a log book provided by the shop and while in the presence of the Foreman or his designee. At this time the AOC representative can inform the Contractor of any jurisdictional or job related information (ex: Building shut down because of a pending visit by high ranking personages) that could effect the Contractor's work that day or in the near future.

C. **The Contractor**, upon finishing work for the day within the jurisdiction, shall proceed immediately to the elevator shop and sign out on a log book provided by the shop and while in the presence of the Foreman or his designee.

PART 2 - PRODUCTS

2.1 MATERIALS AND COMPONENTS

A. **Steel:** Unless specified otherwise provide steel of a 14 gage minimum thickness.

1. **Sheet Steel (Furniture Steel for Exposed Work):** Stretcher-leveled, cold-rolled, commercial-quality carbon steel, complying with ASTM A366, matte finish. Surfaces shall receive cleaning, rust preventative treatment and where specified a baked enamel finish.
2. **Sheet Steel (for Unexposed Work):** Hot-rolled, commercial-quality carbon steel, pickled and oiled, complying with ASTM A569.
3. **Structural Steel Shapes and Plates:** ASTM A6, ASTM A36, and ASTM A108.
4. **Enameled Steel Panels:** Flush hollow-metal construction, fabricated from ASTM A 366 (ASTM A 366M) cold-rolled steel, commercial quality, Class 1, matte finish, stretcher leveled. Factory finish all exposed sheet steel surfaces, clean and then provide a rust preventative treatment by bonderizing or other equally serviceable approved process. Sheet steel work exposed on car interior shall receive a six-coat baked enamel finish consisting of three coats of primers and surfacing material and three coats of enamel. Each coat shall be evenly applied in sufficient quantity to completely cover the preceding coat, baked at proper temperature and then rubbed smooth. The final coat shall be rubbed to an eggshell gloss.

B. **Satin Stainless Steel:** ASTM A 167, Type 302 or 304, with No. 4 satin finish.

C. **Bronze Sheet:** Stretcher-leveled, resquared sheets composed of 90% copper and 10% zinc similar to Commercial Bronze, Alloy Group 2/[60% copper and 40% zinc similar to Muntz Metal, Alloy Group 2], with standard temper and hardness required for fabrication, strength and durability. Clean and treat bronze surfaces before mechanical finish. After completion of the final mechanical finish on the fabricated work, use a chemical cleaner to produce finish (Federal Standard and NAAMM nomenclature) matching Architect's sample:

1. Fine Satin (Brushed) Bronze: M31-C12-06X, fine-satin bronze, clear-coated (US10) with clear-organic coating recommended by Fabricator. Provide graining direction the longest dimension.

D. **Aluminum:** Extrusions per ASTM B221; sheet and plate per ASTM B209. Aluminum work shall have a uniform fine satin finish (180-220 emery) on exposed plain surfaces and shall be anodized in natural color.

E. **Extruded Nickel Silver:** Extruded-nickel silver, ASTM B 151 (ASTM B 151M), alloy UNS No. C74500, with grooved surface, 1/4 inch (6.4 mm) thickness, polished finish.

F. **Fire-Retardant Treated Plywood or Particle-Board Panels**: Minimum 3/4" thick backup for natural finished wood, and plastic laminate veneered panels, edged and faced as shown, provided

with suitable anti-warp backing; meet ASTM E84 Class "I" rating with a flame-spread rating of 25 or less, registered with Local Authorities for elevator finish materials.

G. **Paint Materials**: Coat ferrous metals with the following paint materials. Note, materials may be provided by any one of the manufacturers listed below, however, all materials selected shall be from the same manufacture to ensure system compatibility.

1. **Primer:** Quick-drying, rust-inhibitive, alkyd-based or epoxy-metal primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils (0.038 mm).

a.	Devoe:	13101 Mirrolac Rust Penetrating Metal Primer.
b.	Fuller:	621-04 Blox-Rust Alkyd & Structural Metal Primer.
c.	Glidden:	5207 Glid-Guard Tank & Structural Primer, White.
d.	Approved equals.	

2. **Undercoat:** Alkyd, interior enamel undercoat or full-gloss, interior, alkyd-enamel finish coat, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).

a.	Devoe:	70XX Mirrolac Interior/Exterior Alkyd-Urethane Gloss Enamel.
b.	Fuller:	220-07 Interior Alkyd Enamel Undercoat.
c.	Glidden:	4500 Series Glid-Guard Alkyd Industrial Enamel.
d.	Approved equals	

3. **Finish Coat:** Full-gloss, alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).

a.	Devoe:	70XX Mirrolac Interior/Exterior Alkyd-Urethane Gloss Enamel.
b.	Fuller:	312-XX EPA Compliant Heavy-Duty Enamel.
c.	Glidden:	4500 Series Glid-Guard Alkyd Industrial Enamel.
d.	Approved equals.	

H. **Conduit**: Unless otherwise specified or approved, all electrical conductors, except traveling cable connections to the car, shall be installed in rigid zinc-coated steel or aluminum conduit, electrical metallic tubing or metal wireways. All raceways completely embedded in concrete slabs, walls, and floor fills shall be rigid steel conduits. No rigid conduit shall be smaller than 3/4-inch electrical trade size. Where permitted by NEC, 1/2-inch trade size conduits and EMT may be used only for tap connections, not exceeding 18 inches in length, to interlocks, emergency exits and leveling units. Self-supporting connections, where approved, shall be fully protected from abrasion, or other mechanical injury. Existing raceways in the elevator machine rooms and hoistways may be reused if code conforming. Each conduit run or duct shall contain 10% spare wires and, in any event, not less than one spare wire.

1. **Flexible Conduit:** Connect motors and other components subject to movement or vibration, to the conduit or EMT systems with flexible conduit. Permitted flexible metal conduit shall contain a green-coded equipment grounding conductor. Flexible heavy-duty service cord, Type SO, may be used between fixed car wiring and car door switches for infra-red screen detectors. Electrical connections to machinery shall allow one foot of lateral motion.
2. **Machine Room:** All conduit connecting the various items of elevator equipment in the elevator machine room shall be run in concealed positions insofar as practicable. An auxiliary gutter may be used between, starter, and similar apparatus in the elevator machine room. Metal wireways and auxiliary gutters shall be run exposed in readily accessible locations. Such wireways or gutters shall be routed in a manner which does not infringe upon minimum vertical or horizontal clearances imposed by applicable Codes and which does not impede the utilization of existing trolley-hoist systems to move equipment or components from the machine rooms to the existing trap doors.
3. **Fittings:** Raceway terminal fittings must provide conductor passageways free from burrs, shoulders or other projections which will reduce internal passage area or cause abrasion of conductors being pulled through. All conduit terminating in steel cabinets, junction boxes, wireways switch boxes, outlet boxes and similar locations shall have approved insulation bushings. If the bushings are constructed completely of insulation material, a steel locknut shall be installed under the bushing. At ends of conduits not terminating in steel cabinets or boxes, the conductor shall be protected by terminal fittings having an insulated opening for the conductors. Couplings and connectors for EMT shall be made either of steel or malleable iron only, shall be "concrete tight" or "rain tight" and shall be either the gland and ring compression type, or the stainless steel multiple point locking type. All connectors shall have insulated throats. Conduit and EMT fittings and connections using set screws or indentations as a means of attachment shall not be used.
4. **Standards for Conduits and Fittings**: Provide materials in conformance with the following Federal Specifications:

    a. Conduit, steel, rigid, zinc-coated: WW-C-581.
    b. Conduit, aluminum, rigid: WW-C-00540.
    c. Conduit, flexible (watertight):WW-C 566C(1).
    d. Fittings: same metal as conduit, W-F-406 or W-F-408D.

I. Electric Wiring: Provide in compliance with NEC requirements all wires and cables necessary for the proper connection and operation of all equipment installed under the elevator contract. All interconnected devices shall be compatible. Provide new elevator fixed wiring and traveling cable. Existing conduit, wire duct and fillings may be reused provided they meet current requirements of NEC. Terminal connections for all conductors at equipment panels, hoistways, and on elevator cars shall be made on terminal blocks or studs having identifying numbers. Make all conductor connections with terminal eyelets of the solderless type.

1. **Conductors and Cables:** Provide circuit conductors, exclusive of traveling cables, of solid annealed or stranded copper with 600-volts, 75 deg. C or higher-rated type THWN insulation, except as otherwise approved. Code individual wires and all connections on identified stud connections in any wiring except at terminal blocks, control cabinets, junction boxes or conduits. Provide solderless wire connectors (cable lugs) conforming to FS W-S-601 for conductors used for external wiring, except that conductors No. 10 and smaller may be made with approved terminal eyelets fixed on conductor by special tool

or with approved pressure-type terminal blocks. Unless otherwise specified, no joints or splices will be permitted in wiring except at outlets.

a. Single and multiple conductor cables shall have a color coding or other suitable identification for each conductor.
b. Terminal connections for all conductors used for external wiring between the various items of elevator equipment shall be solderless pressure wire connectors, in accordance with Federal Specification W-S-610D(1) or UL Standard No. 486.A-80. Connections for wire size No. 10 or smaller shall be of the crimp type applied with an appropriate setting tool. Terminal blocks having pressure wire connectors of the clamp type that meet UL 1059-88 requirements for stranded wire may be used in lieu of terminal eyelet connections. Terminal blocks using pierce-through serrated washers will not be acceptable.

2. **Grounding:** All wiring shall test free from short circuit or grounds. The insulation resistance between external conductors, and between conductors and ground, shall not be less than one megohm. Provide grounding and bonding in accordance with the NEC.
3. **Circuit Lists:** Attach waterproof, neat and legible lists, showing wiring runs, color codes and number codes to the controller.
4. **Entrance Wiring:** The interlock wiring of all elevator entrances shall conform to the requirements of the A17.1 Code. Termination in the interlock box shall be sleeved with a fire-resistive eyelet or other approved type jacket.

J. **Traveling cables**: Provide new flexible traveling elevator cables, conforming with the requirements of NEC Article 620. Provide color code identification each conductor within the traveling cable. New traveling cables shall have a flame-retarding and moisture-resistive outer covering. At a minimum, suitably support the traveling cable at the midpoint of the hoistway by a wire rope steel core to relieve strains in the individual conductors.

1. **Conduits:** At the car end of each traveling cable, run the traveling cable in conduit or wire duct from underneath the car platform to the car operating panels or top of the car junction boxes. At the machine room end of each traveling cable, run the traveling cable in conduit from the hoistway junction box to the control equipment cabinets. Run traveling cable in conduit for horizontal runs in the hoistway.
2. **Communication Spares:** Provide a minimum of ten (10) pairs of twisted shielded conductors future systems.
3. **Controller Spares:** Provide twenty (20) percent or ten (10) pairs, whichever is greater, spare wires between the controller, microprocessor and encoder selector, car wiring and supervisory control panel in all traveling cable.
4. **Labeling:** All conductors, including spares, in traveling cables shall be tag coded at their terminals in the machine room, the elevator car junction box, stations within the cab, and the supervisory control panel.
5. **Protection:** Provide suitable shields or pads wherever necessary to prevent chafing or damage to traveling cables from hoistway construction.

K. **Fused Safety Switches:** Safety switch for the lighting circuit shall be listed and labeled by UL. Comply with UL Standard 98, NEMA Standard KS 1 and Federal Specifications WS-865c for type HD.

1. **Shall be heavy-duty, fused, horsepower rated**, single-throw knife switch with quick-make/quick-break mechanism, capable of full load operations. Meet NEMA specifications for Class A switches.
2. **Provide with contact arc-quenching devices,** such as magnetic blowouts or snuffing plates. Provide self-aligning switchblades with silver alloy contact areas and designed so that arcing upon making and breaking does not occur on the final contact surfaces. Provide with high-pressure, spring-loaded contact. Mount switch parts on high-grade insulating base.
3. **Enclosure and Lugs**: NEMA I with hinged door, and defeatable interlock when switch is in "On" position and can be positively padlocked in "Off" position. Lugs must be UL listed for aluminum and/or copper conductors and be front removable.
4. **Amp rating, voltage rating**, fusing and number of poles as shown or as required. The devices must be provided with UL listed rejection feature to reject all but Class R fuses. Provide horsepower rated switch and fuses to match motor load if no size is shown. Use 3 pole plus solid neutral switches on four wire circuits and 3 pole switches on all other circuits, unless otherwise noted. Provide fuses for each pole.
5. **Mounting**: Mount switch enclosure rigidly and with proper alignment on building structure or steel supports with centerline of operating handle not more than 6 feet above finished floor unless otherwise required. Use steel supports fabricated from standard rolled structural steel shapes or framing channel to provide one-inch separation between enclosure and building wall for vertical flow of air.

    a. **Provide connections** and wiring to and from each disconnect switch. Support conduit feeder from ceiling or floor.
    b. **Disconnect switches** shall be mounted on adjacent wall or from the floor with independent supports, level and plumb.
    c. **Close unused** openings in the enclosure with approved covers.

6. **Identification:** Engraved, Plastic-Laminated Labels, Signs, and Instruction Plates: Engraving stock melamine plastic laminate, 1/16-inch minimum thick for signs up to 20 square inches, or 8 inches in length; 1/8-inch thick for larger sizes. Engraved legend in white letters on black face and punched for rivets. Install plates with rivets.
7. **Testing**: Subsequent to completion of installation of electrical disconnect switches, energize circuits and demonstrate compliance with requirements. Except as otherwise indicated, do not test switches by operating them under load. However, demonstrate switch operation through six opening/closing cycles with circuit unloaded. Open each switch enclosure for inspection of interior, mechanical and electrical connections. Demonstrate defeatable interlock when switch is in "On" position. Correct deficiencies then retest to demonstrate compliance. Remove and replace defective units with new units and retest.

L. Circuit Breaker: will be furnished and installed by the Government. The circuit breaker will be equipped with a 120 V shunt trip device.

    1. Interrupting capacity will be as follows:

        a. As a minimum, the breaker used on a 120/208 volt systems shall be not less than 10,000 AIC, minimum frame size 100 amperes.

2. Identification: Engraved, Plastic-Laminated Labels, and Signs: Engraved stock melamine plastic laminate, 1/16-inch minimum thick for signs up to 20 square inches, or 8 inches in length; 1/8-inch thick for larger sizes. Engraved legend in white letters on black face and punched for rivets. Install plates with rivets.

M. **Trademarks:** Do not display manufacturers name or trademark on exposed surfaces of new materials or components.

2.2 **CONTROLLERS AND SELECTORS**:

A. **General:** Provide solid state control equipment, in manufacturer's standard NEMA 1 enclosure, designed to control starting and stopping, to prevent damage to motor from overload or excess current, and to automatically disconnect power supply, apply brake and bring car to rest in event of power failure or upon activation of safety device. Controller's failure modes shall prevent power from being applied to drive machine in event of phase reversal, single phase, phase failure, or low voltage which would result in elevator malfunction. The controller shall be as manufactured by MCE (Motion Control Engineering), 11380 White Rock Road, Rancho Cordova, CA 95742, 1-800-444-7442.

1. **Frame:** Securely mount all assemblies, power supplies, chassis switches, relays and other items on a substantial, self-supporting steel frame.
2. **Switch and Relay Design:** Provide where required, direct-current type, magnet operated with contacts of design and material to insure maximum conductivity, long life and reliable operation without overheating or excessive wear, and provide a wiping action to prevent sticking due to fusion. Provide switches carrying highly inductive currents with arc deflectors or suppressors.
3. **Microprocessor-Related Hardware:** Provide printed circuit boards with FR4 or G10 glass epoxy material with a minimum equivalent one-ounce copper. Isolate inputs from external devices (such as push buttons) with opto-isolation modules. Provide separate regulated power supply for each computer chassis. Provide control circuits so that one side of power supply is grounded for testing purposes. Provide the capability for the system to restart when power is restored in the event of a power failure or interruption. Provide system memory so that data is retained in the event of power failure or disturbance.

a. **Noise**: The building contains many computer systems, including computer terminals, mini-computer systems, and personal computers. Provide built-in noise suppression devices which provide a high level of noise immunity on double-sided printed circuit boards and on all solid-state hardware, power supplies, and devices. The controllers shall not introduce voltage transients or constant noise components which exceed 250 millivolts at any frequency between 1,000 and 10,000 Hz to the building distribution system. The Contractor shall provide all necessary additional equipment including, but not limited to: filters, inductors, and isolation transformers, which are required to satisfy these requirements at no additional cost to the Government. After installation of each controller, noise measurements will be made by the Architect at various points determined by the Architect.

4. **Power Supplies:** Provide tested and labeled short-circuit protection.
5. **Wiring:** Provide copper wires for factory wiring. Neatly route all wiring interconnections and securely attach wiring connections to studs or terminals.
6. **Marking:** Permanently mark components (relays, fuses, PC board, etc.) with symbols indicated on approved shop drawings.
7. **Extender Boards:** Provide extender boards when computing devices are used inside a computer chassis to facilitate access to the printed circuit cards utilized.
8. **Time Base:** Provide stable capacitor or crystals as the time base for electronic time-delay devices.

B. **Automatic Operation Systems**: Provide micro-computer based control system for each elevator or group of elevators, as required, to provide automatic or group automatic operation of type indicated, and defined in the Code as "Operations." Include all hardware required to connect, transfer and interrupt power, and protect the motor against overloading. The system shall also perform car operational control.

1. **Single Car:** Provide "Selective Collective" as defined in ASME A17.1.

C. **Control Features**:

1. **Motion Control**: Provide a microprocessor based closed loop feedback control which continually maintains an ideal speed curve. Base speed curve on minimum acceleration/ deceleration rate of 3 feet per second, and incorporate analog signal feedback reference pattern with digital car position count so that an ideal speed curve is exactly duplicated regardless of car load, machine room temperature, or hoist rope stretch. Provide smooth, comfortable acceleration, retardation and dynamic braking and limit difference in speed between full load and no load to not more than +/- 5% of contract speed.

    a. **Horizontal Acceleration within Cars during All Riding and Door Operating Conditions:** Not more than 15 mg in the 1 - 10 Hz range.
    b. **Acceleration and Deceleration:** Constant and not more than 5 feet/second/second with an initial ramp between 0.5 and 0.75 second.
    c. **Sustained Jerk:** Not more than 8 feet/second/second/second
    d. **Automatic Leveling:** Stop car within 1/8" above or below the landing sill. Avoid overtravel, as well as undertravel, and maintain stopping accuracy regardless of load in car, direction of travel, rope slippage or stretch.

2. **Door Operation**: Automatically open door when car arrives at main landing whether car call has been registered or not. When another car is at main landing loading for departure, do not cause an unoccupied car arriving to open its door until a car call demand is registered on that floor. Reopen when car is designated for loading.
3. **Anti-Nuisance Feature**: If car loading is not commensurate with registered car calls, cancel car calls.
4. **Traffic Monitoring**: Provide operation and control compatible with Architect's Monitoring System that permits modification of the elevator operation to accommodate special traffic requirements. Building programmable functions shall include, but are not limited to, the following:

a. Monitoring traffic and car operation with histogram of waiting times.
b. Designation and activation of priority floors, security floors, second home floor for dual or alternate home floor operation.
c. Activation of up peak, down peak.
d. Initiation of independent service, Fireman's service, etc.
e. Dispatch Protection: Backup dispatching in the event primary dispatcher fails.
f. Position Sensing: Reset at each floor when stop made, and at no less than 150 intervals in express zones.
g. Landing Button Failure: Independent power sources for each push-button riser.

5. **Standby-Power**: If normal power fails, adequate standby power will be supplied by the Government through normal power feeders to start and run the elevator back to its designated floor, doors will reopen to discharge any passengers and power will be removed. Upon loss of normal power, there shall be an adjustable time delay before transferring to auxiliary power of between 10 to 30 seconds. Connect to existing emergency power selector switch. The cabinet is labeled "United States Supreme Court Elevator Emergency Panel."

a. **Operation:** As the elevator reaches the designated floor and shuts down, another elevator shall be started and returned. This process shall continue until all elevators have been returned to the designated floor and shut down. Any elevator which has been manually removed from automatic service, i.e., inspection service, independent service, fire service, main line switch opened, etc., shall not receive an automatic return signal. Elevators signaled but unable to start or complete its return within a minimum of 20 seconds shall be by-passed. When an elevator is by-passed, another elevator shall be started and returned. If for any reason the selected car in a group enters a failure conditions, operations shall be automatically transferred to the next available car in that group. Any elevator or elevators by-passed on initial return signal shall be signaled again.

D. **Micro-Processor System**: Use readily-reprogrammable system software. Design basic algorithm to optimize service based on equalizing system's response to registered hall calls at shortest possible level and equalizing trip time at shortest possible level. The program shall be read and understood through the use of a data link to the MS/WINDOWS compatible dispatch computer, which will be part of the controller package. The program(s) shall keep a history of all recent events with which the controller is involved. The events include normal functions (use of elevators, availability, etc.), failures, personnel access and their actions.

1. **Diagnostic Capabilities**: Provide diagnostic feature capable of determining all faults. This diagnostic feature shall use the network to constantly monitor the status of all cars via a communication link. Every changing condition of each elevator shall be analyzed against its normal mode of operation. When a fault is detected, the location of the elevator, the time of day; and the number of times said fault has occurred, along with the fault code message, shall be stored in a

non-volatile memory. The system shall support user retrieval of the fault information of every car and its display on the video screen in the machine room.

a. **Diagnostic devices** shall not incorporate timed delay program deletions or file purges. No program shall eliminate data without command from authorized government personnel.

2. **System Security**: The system shall provide multiple higher levels (e.g. password) of security than the key switch lockout. Security functions shall be integrated with control dispatching and management of the elevators. System security equipment provided shall allow the securing of floors via the system and monitoring of the security status of the elevators on CRT screen at a security monitoring station alerting the security personnel to any unauthorized stops.
3. **Local/Remote Diagnostics**: Provide a means to attach a laptop, portable, MS/WINDOWS (latest version) based, computer via com port and cable connector located on reachable area of the inside surface of the controller and/or group controller. The attachment shall allow a mechanic to interrogate the controller as the current and past faults and current conditions as related to the elevator or group. This connection and communication shall be capable without removing or replacing communication to the other listed remote sites.

E. **Independent Service**: Provide a 2-position key-operated switch in the main car operating panel. Label the switch "INDEPENDENT SERVICE." Label "ON" and "OFF" functions. Operations shall comply with Code.

F. **Inspection Service**: Provide switch in car panel to permit operation of elevator from on top of car or top and bottom access switches, for inspection purposes, with car and hall buttons inoperative. Provide an operating fixture on top of car mounted on or from car crosshead containing constant pressure "UP" and "DOWN" buttons for operating elevator, an emergency stop button and a toggle switch which makes top-of-car inspection devices operative.

G. **Attendant Service Operation**: An attendant service switch shall be provided to furnish the following operation:

1. **When the car is stopped** at a landing, the doors shall open automatically and shall remain open until closed by the attendant.
2. **The doors** shall be closed by constant pressure on any one of the following controls:

a. The "door close" button.
b. A car call button.
c. The "up" or "down" buttons.

3. **The car shall receive hall calls** as they would normally be assigned by the control logic, but response shall be determined by the attendant. A momentary buzzer shall sound, and a light shall indicate from which floor the hall call came.
4. **A "bypass" button shall be provided** to override hall calls, permitting the attendant to proceed nonstop to a selected car call.

H. **Fire Fighters' Service**: Provide as per Code (Phase I and II), to operate and recall elevators to the designated floor or the alternate floor in fire or other emergency condition. Provide sensor signal wiring from hoistway or machine room connection point to controller terminals. Provide similar operation and fixtures on all elevators. Operate visual/audible signal until return is complete or automatic operation restored.

1. **Manual and Automatic Modes:** Provide for both manual and automatic "Fire Fighter's Service." Provide a key for the elevator enclosed in a master-keyed, mounted compartment, to activate Phase I Emergency Recall operation. Provide a cabinet which is identical to other installed units in the building. It shall be identical in material, size, arrangement. Inscribe cover of compartment with identical labeling as other compartments in the building. Provide lock master-keyed to match District of Columbia Police and Fire Departments' Call Box Key. Mount the compartment as directed by the Architect on the main and alternate floors. The fire service key shall remain in the lock box.

   a. Locate manual recall switches at both the designated floor and the alternate floor listed. A three position Phase I key switch ("ON," "OFF" and "BY-PASS) for each elevator or group of elevators shall be incorporated into the hall call station at the designated fire return floor. A two position key switch ("ON," "OFF") shall be incorporated into the hall call station at the alternate fire return floor. Provide custom cast panels of a finish matching existing hall station panels, face plate for key box and fireman's direction panel. Key box face plate and fireman's direction panel shall be a single panel.
   b. Provide terminal contacts, properly labeled, in accordance with requirements of NFPA Standard No.72 E, for future connection of smoke detectors to be provided by others.
   c. Instructions: Provide instructions for operation of the elevators under Phase I conditions as part of Phase I key operated switch at designated and alternate floors. Instructions for operation of elevators under Phase II conditions shall be incorporated in or placed adjacent to operating panel in each car. Print instructions in letters not less than 1/8" high, and permanently install with tamper-resistant methods.

2. **Recall Floors:** As identified on the Elevator Schedule at the end of this Section.

I. **Encoder/Selector Associated Equipment:** Except as otherwise indicated, provide new manufacturer's standard pre-engineered elevator encoder/selector system which shall be compatible with the controller and other related equipment.

2.3 MOTOR CONTROL :

A. **General:** This system shall provide for maximum "car start to car stop" time for a typical one floor run with a balanced load at the midpoint of the hoistway as tabulated. A maximum of 0.8 seconds will be allowed from door close to car start. The performance times shall be maintained without "hunting" at the floor levels. Prior to termination of the adjustment period, the elevators shall be readjusted, as required, to meet these performance requirements within 10 percent.

1. **Voltage Tolerances:** The equipment shall be designed to operate at plus or minus 10% of normal feeder voltage and plus or minus 3% of feeder frequency without damage or interruption of elevator service. Protective devices shall be included to prevent damage on over or under voltage.
2. **Isolation of Components:** Isolate the inputs from external devices (such as hall buttons) and isolate the outputs to external devices (such as indicators) by means of relays or optical devices. Provide for separate regulated power supplies to serve each microprocessor system.
3. **Performance Requirements:** Overspeed governor switch shall operate in the "up" and "down" direction of travel. The speed shall be maintained within (5%) percent of contract speed. The system shall operate from 90-110 percent of normal line voltage.

B. **Motor Drive (Silicon Controlled Rectifier)**: Except as otherwise indicated, where variable voltage is required, provide manufacturer's standard solid-state power converters, for use with manufacturer's motors on elevator machines. The motor drive unit shall be especially designed for elevator service and must comply with A17.1 Code Rule 210.10. At no time shall the motor be used in a plugged mode, nor shall load absorbing ballast resistors be used except for emergency stopping as a result of line loss. Verify that existing feeders are of sufficient size and meet NEC code.

1. **Filters and Chokes**: Provide sufficient line filters or chokes to prevent electrical peaks or spikes from being fed back into building power system from solid-state converters.

   a. The Supreme Court Office Building contains a large population of computer systems, including computer terminals, mini-computer systems, and personal computers. The variable speed motor controllers shall introduce no voltage transients or constant noise components which exceed 250 millivolts at any frequency between 1,000 and 10,000 hertz to the 480 volt, 60 hertz building distribution system.
   b. The Contractor shall submit suitable calculations to indicate that the controllers will be compatible with the systems listed and comply with the performance requirements specified in Paragraph a. and b., above. If the controllers do not meet these requirements, the Contractor shall provide all necessary additional equipment including, but not limited to, filters, inductors or isolation transformers, which is required to satisfy these Special Requirements at no additional cost to the Government.
   c. Following installation of each of the controllers procured herein, measurements will be made by the Government at the point of common coupling to the building power distribution system as shown on the single line riser diagram. Several measurements will be made with all variable speed motor controllers in operation at various output frequencies to verify compliance with the performance requirements specified in Paragraph a. and b., above.

2. **A voltage control system** which utilizes direct current voltage obtained from a four (4) quadrant, twelve (12) SCR, full wave regenerative silicon controlled rectifier drive shall be provided. The silicon controlled rectifiers or thyristors shall be provided with means for proper heat dissipation, switching arrangements

to permit the passage of regenerated power and a smoothing reactance to eliminate completely mechanical vibrations and structure borne sound from ripple voltage transients.

3. **Suitable switches shall** be provided to control the static control from the machine room and (where specified under method of operation) from the car. The switches shall be arranged so that the motor drive unit may be energized or de-energized from the car and Firefighters' Service Panel.
4. **During the releveling**, sudden application of full output from a solid state control amplifier shall not cause the car to move more than nine inches from the floor level in either direction of travel.
5. **Transformers shall be grounded** according to the NEC.
6. **Verify that existing feeders** will meet the requirements of the new SCR drive.

2.4 **MACHINE ROOM EQUIPMENT:**

A. **General**: Existing machine room will be reused. Provide new governors and tension sheaves.

B. **Machine Beams and Other Support Steel**: Existing elevator machine beams, sheave beams, dead end beams, and rope fastening plates shall be reused. All beam anchorings shall be examined and made secure. All fastenings shall be examined and made secure. If additional support beams are required, Contractor shall notify the Architect in a timely manner in writing stating all facts and recommendations.

C. **Sleeves and Guards:** Provide sleeves for conduit and other holes, projecting above the concrete slab. Provide 2" steel angle guards around cable or duct slots. Provide rope guards for all sheaves and cables.

D. **Governor:** New, centrifugal type conforming to Code. Mount over the hoistway and connect to the car safety tripping mechanism by means of a wire rope. The governor rope shall pass over the governor sheave and under the weighted-tension sheave in the pit.

1. Jaw Design: The governor jaws shall grip the cable with a minimum delay after the governor reaches its tripping speed and shall be held in engagement with the cable by springs and the tension of the governor cable. Design governor jaws so that the governor cable may slide through them after the safety has set without damage to the cable.
2. Adjustment: Accurately adjust the governor to operate within limits specified by the Code. All adjustable parts shall be sealed.
3. Switches: The operation of the governor on overspeed shall open a switch disconnecting the power to the elevator before a safety mechanism has tripped. A second switch shall be provided to remove power to the elevator.
4. Marking Plate: Provide a metal marking plate securely fastened to the governor and marked with governor tripping speed, rope size and construction.
5. Tension Sheave: The new tension sheave in the pit shall be mounted in a weighted steel frame securely fastened to the main car or counterweight guide rails and provided with guides or pivot points to enable free vertical movement. The existing tension sheaves may be reused if suitable. Provide adequate bearings to ensure noiseless operation.

E. **Refurbish Traction Hoist Machine**: Rewind and rewire existing gearless machines. The work shall include, but not be limited to, the following:

1. Movement of the motor from site and back to site for work required at a remote facility.
2. Complete disassembly and evaluation of both armature and fields. All commutator surfaces shall be restored to original factory specifications. Stoning or turning and undercutting shall be performed. All slots shall be properly cleaned.
3. Complete replacement of all bearings. Seal all lubrication leaks, flush all lubrication reservoirs and add new lubrication that meets original manufacturers specification or meets existing upgraded standards for this machine.
4. Rewinding, rewiring and insulating of all electrical parts. Provide radial type staggered brush holders, shunts and bars. Include new brushes.
5. Disassemble brake core, rewind, replace worn parts (i.e. liner and brake core sleeve, pins .etc.), clean unit, and adjust operation. Inspect the brake bearing surface and turn the surface within acceptable tolerance to remove surface imperfections. Perform a test using dye to reveal cracking of the braking surface. Provide a written report with the results.
6. Balancing of rotor using static and dynamic methods with the rotor under conditions similar to that which the rotor would normally experience.
7. Replace all brake shoes with asbestos-free linings.
8. Reassemble, return and reconnect.
9. Megger test the machine on arrival at the repair facility. Maintain a minimum of 500 V for at least a minute. Include readings for the series fields, the shunt fields, and the interpoles. Forward the test promptly to the Architect for the record. Forward the test before the unit is renovated. When repairs are complete, repeat the test. Forward the test promptly to the Architect. Any replacement parts used shall be supported by copies of invoices from a recognized supplier of original replacement parts. Submit the name of the supplier for approval.
10. Thoroughly clean and paint the machine.
11. Replace any missing, damaged bolts, nits and washers.

F. **M-G Set Pads:** Retain the concrete m-g set pads leaving their surface substantially level. Use the pads for mounting the isolation transformers or filters. Remove any concrete debris.

2.5 **HOISTWAY:**

A. **General**: Except as noted, existing equipment shall be refurbished and retained if compatible with new operation and components. Provide any modification or addition necessary to meet current codes and standards.

B. **Refurbish Guide Rails:** Retain existing car and counterweight guide rails and brackets. Thoroughly clean all guide rails of grease, oil and other foreign substances, file and remove all rough edges and surfaces and tighten brackets, bolts and guide clips for smooth and quiet operation of car and counterweight.

1. Provide any required rail backing and/or intermediate tie brackets to comply with Code.
2. Guide rails shall be realigned with a maximum deviation of 1/8 inch from plumb in all directions. Show guide rail loads on safety application on shop drawings.

C. **Car and Counterweight Buffers**: Provide new pit-mounted car and counterweight buffers having adequate stroke designed to bring fully loaded car and counterweight to rest from governor tripping speed at average rate of retardation not exceeding gravity. Oil buffers shall be of spring return type. Means shall be provided for checking oil level.

a. Provide a new buffer switch in an independent circuit from the safety string circuit.

D. **Counterweight Frames:** Retain the existing counterweight frames. Thoroughly clean and secure all fastenings. Add or remove weights to assure proper counterbalance. Metal filler weights shall be held securely in alignment with tie rods passing through holes in the weights and frame members. Equip rods with locknuts secured by cotter pins at each end. Replace any missing fasteners matching existing fasteners.

1. **Counterweight and Guard:** Counterbalance each elevator with weight equal to weight of elevator car plus 40% of rated load for geared machines. Provide counterweight screen at least 6' high at bottom of hoistway.

E. **Deflector Sheaves, Car Sheaves, and Counterweight Sheaves :** Replace all existing sheaves. Replace with same size sheaves and new type roller bearings, and shafts. Match original blocking. Provide all sheaves with guards where necessary.

F. **Refurbish Fascia, Toe Guards, Dust and Hanger Covers**: Thoroughly clean, make all fastenings secure, replace missing fasteners, and paint with one coat of machinery enamel. Replace any missing panels with new; coordinate with Architect in accordance with the “Official Procedures for Making Changes to Contracts” if such work will result in additional cost. Re design dust covers that are on hinges to stay open when mechanic is working on the door lock. Submit design for approval.

G. **Refurbish Struts and Headers**: Thoroughly clean, make all fastenings secure, and paint with one coat of machinery enamel.

H. **Guide Shoes/Rollers:** Provide the passenger car and counterweight frame with four (4) sets of new guide roller assemblies. Provide each wheel with 2 ball bearings having total indicator run (TIR) of not more than 0.002". The guide shall consist of at least 3 neoprene rollers, mounted on a substantial metal base. The design of the guide shall be such that all rollers shall have continuous contact with the corresponding guide rail surface under all conditions of loading. Pin roller guides after adjustment. Adjust all roller guides to equal torque loading not exceeding 50 foot-pounds.

1. Auxiliary Guides: All car and counterweight guides shall be equipped with an auxiliary guiding device for each guide shoe which shall prevent the car or counterweight from leaving the rails in the event that the normal guides are fractured. These guides shall not, during normal operation, touch the guiding surfaces of the rails. The auxiliary guides shall be fabricated from hot rolled steel plate and shall be mounted between the normal guide shoes and the car or

counterweight frame. The auxiliary guides may be an extension of the normal guide mounting plate, if that plate is fabricated from hot rolled steel. The portion of the auxiliary guide which comes into contact with the rail surface in the event of loss the normal guides shall be lined with an approved bearing material to minimize damage to the rail surface. Submit design and sample of bearing material to the Architect for approval.

I. **Hoisting and Governor Ropes:**

1. **Hoisting Ropes:** Provide new preformed hoist ropes of proper size and number to insure good wearing qualities. Hoisting ropes shall be designed for elevator service, with flexible construction traction steel with lubricated fiber core; sized and displaced or broken wires. As a minimum, the number of ropes shall comply with the factor of safety requirement of the Code, Rule 212.3
2. **Governor Ropes:** Provide new governor ropes, of construction and composition required for the governor furnished. Under normal operation of the elevator, the governor rope shall run free and clear of rope guards and other stationary parts.
3. **Wedge Sockets:** Provide adjustable wedge sockets with rods for each end of the ropes. All wedge sockets on the car and counterweight shall be prevented from twisting. Provide sound deadening material.

J. **Pit Equipment:**

1. **Pit Ladder**: Reuse existing pit ladder.

2. **Emergency Stop Switch**: Provide manually operated, enclosed-type switch. Provide either red operating handles or red pushbuttons, permanently labeled as to function with the words: "STOP" and "RUN." Conspicuously label the switch with "Emergency Stop Switch." When operated, power shall be removed from the hoist motor and brake.

2.6 **HOISTWAY ENTRANCES**:

A. **General**: Existing hangers, closers, tracks, door guides, sight guards, and bumpers shall be replaced at all floors. Reuse existing struts and hanger supports. Replace any corroded hardware.

B. **Hangers and Tracks General**: Provide sheave type two point suspension hangers and tracks complete and suitable for the type of door operation specified. Provide two (2) hanger units per door panel fastened to the door panel. Fabricate sheaves of steel with a flanged groove in which a solid polyurethane tire shall be securely vulcanized. Sheaves shall include ball bearings sealed to retain grease lubrication and shall be mounted on steel housings arranged for attaching to the doors. Hangers shall be provided with ball bearing adjustable rollers (vertical and horizontal) to take the upthrust of the doors. Tracks shall be cold drawn steel with surfaces shaped to conform to the tread of the hanger sheaves and rollers. Equip each car door panel with new 2-sheave type, 2-point suspension hangers with provisions for vertical and lateral adjustment.

C. **Frames (Refurbish)**: Reuse the existing entrance frames and recondition. Metal frames shall be cleaned and polished. Provide raised floor designations with braille signage which shall be permanently attached with contrasting color background and 2 " square in size at height of 60" above floor.

D. **Sills (Refurbish)**: Sills shall be cleaned, all fastenings secured and any loose or missing grout replaced.

E. **Door Panels (Refurbish)**: Clean and polish. Secure laminations where they have separated from supporting base. Doors shall be provided with rubber bumpers for stopping doors at their limits of travel in the opening direction. Bumpers shall be provided on strike jambs at top and bottom.

F. **Sight guards and astragals** shall be provided on the leading edge of center opening doors. The sight guards shall be of 0.06" inch formed metal of the same material and finish as the landing side of the doors.

G. **Interlocks and Contacts**: New interlocks shall be electro-mechanical and function as a hoistway unit system without a retiring cam, to prevent operation of car until all doors are locked in the closed position, as specified in the Code. Interlocks shall be compatible with the other door operating components. Provide emergency unlocking devices where required to conform to Code requirements.

1. **Car Door and Car Top Emergency Contacts**: Contacts shall be designed to prohibit
accidental contact with energized electrical components.

H. **Access Switches**: Provide new keyed access switches at the top and bottom floors. These switches shall be keyed with the same key as the inspection service switch. This switch is to allow the mechanic to have exclusive control of the elevator while either in the pit or on the top of the elevator. Limit travel of bottom key access switch to one floor. Provide face plates to be identical to the face plates on elevator no. 2.

I. **Floor Numbers**: Stencil painted 4" high floor numbers in contrasting color within the

hoistway per Code.

2.7 **CAR FRAME AND PLATFORM:**

A. **General (Refurbished)**: Reuse existing frame. Check for proper alignment and correct if necessary. All bolt connections shall be checked, tightened or replaced where necessary. Provide balancing weights and frame as required to achieve true static balance front to rear and side to side.

B. **Car Top Control Stations**: Provide new as per Code. Attach securely to the crosshead on the hoistway door side.

C. **Safety Device**: Safety device shall conform to CODE. Equip each car with an under car safety, mounted on car frame. The guide grips shall be Type "B".

D. **Toe Guards**: Provide per Code or refurbish as necessary, paint with enamel paint color as directed by the Architect.

2.8 **PASSENGER CAR ENCLOSURE:**

A. **General (New):** Except as otherwise indicated, recondition car enclosures and doors as further indicated. Include access doors, power door operators, sill (refurbish), trim, accessories, and top of car locked emergency exit. Recondition horizontal sliding doors. Provide sight guards on door edges.

1. Materials and Fabrication: Provide selection as indicated for the car enclosure surface; manufacturer's standards, but not less than the following:

a. Sill: (Refurbish): Sills shall be cleaned, all fastenings secured or replaced if missing..
b. Reinstall the existing control panel. This will be non-functional, but will be reinstalled for historic reasons. Modify the existing wood panel to accept the new control panel identical to the control panel in elevator 2. Provide a key switch in the control panel which when activated will enable the elevator security system to prevent access to the 2nd floor to unauthorized personnel.
c. Lighting and Fan: Refurbish the existing lighting fixtures, normal and emergency. Replace missing or broken glass panels, replace wiring and porcelain sockets. Relamp fixtures with bulbs so as not to exceed the maximum wattage of the fixture. Replace fan wiring, motor and impeller. Clean remaining parts, then rewire to new two position (ON, OFF) fan switch in the new control panel.
d. Floor: Install new diamond plate flooring.

B. **Handrails**: Install Government provided handrails.

C. **Ventilation System**: Provide new and arrange to exhaust air through and across new ceiling.

1. The system shall include a blower driven by a direct connected motor and mounted on top of car with rubber isolation to effectively prevent transmission

of vibration to the car structure. The blower shall have not less than two operating speeds with a rated free delivery air displacement of approximately 325 and 290 C.F.M. at the respective speeds. The unit design and installation shall be such that the maximum noise level when operating at high speed shall not exceed 5 decibels from a reading approximately 5 feet above the car floor.

2. A three position switch to control the unit shall be provided in the car service cabinet.

3. The fan or car ventilation shall be so arranged for automatic starting and stopping. When elevator has static control, the fan shall be arranged to start automatically when there is a demand for service and stop a predetermined time (approximately 2 minutes) after car has answered the last registered call.

D. **Car Lighting**: Car interior lighting fixtures, normal and emergency, shall refurbished as described above. Car light switch in the car operating panel shall control car interior lighting.

E. **Emergency Car Lighting**: Provide emergency lighting system for the car consisting of a rechargeable battery, charger, and controls. The system shall automatically provide emergency light in the car upon failure or abnormal interruption of the normal car lighting service and shall function irrespective of the position of the light control switch in the car. The system shall be capable of maintaining a minimum illumination of 1.0 foot candles when measured 4 ft. above the car floor and on the main operating control panel for a period of not less than 4 hours.

1. Battery: 6 volt min., sealed, maintenance-free, of either lead-acid or gel cell construction and designed to provide a life expectancy of not less than 10 years. The term "sealed" specified means sealed against loss of electrolyte and against gassing, except for over-pressure vents which shall be leak-proof. Batteries using adaptor type water conserving or catalytic devices are not acceptable.

2. Charger: The charger, including rectifier and controls, shall be solid-state, except load relay, if used, shall be hermetically sealed. The charger shall be of two-rate design and shall be capable of restoring the battery to full charge within 16 hours after resumption of normal power supply following a continuous discharge of four hours through the connected lamp load and automatically maintaining the battery in full charge under normal power supply conditions.

3. Housing: House the battery, charger and controls in an enclosure fabricated of either sheet steel or molded high-impact plastic with a dust-tight cover. Design the enclosure for permanent mounting on the elevator car top and of sufficient strength to support a 200 lb. person without malfunction or damage.

4. Test Switch: Provide on the exterior of the enclosure, a constant pressure switch that automatically returns to the "OFF" position when released and a pilot light for periodic testing of battery and lamps.

5. Light Fixture: Use the new lighting fixture mounted in the new control panel.

F. **Car Doors**: Except as otherwise indicated, provide a new car door operator, provide new door hangers, tracks, interlocks, closures and relating cables. Door panels shall be replaced. Mount door operator on car door header braced to the car frame independent of the car enclosure to prevent any movement of the car during the opening and closing of the car door. Install escutcheons in existing openings for elevator keys.

1. Car Doors shall be replaced. Each door panel shall be hung on two point suspension sheave type ball bearing hangers. The door panels shall be reinforced

for installation of hangers, door operating equipment, door reopening device and hardware, and unlocking zone device. Each door panel shall be guided at the bottom by two nylon or composition gibs engaging door threshold grooves with a minimum clearance. Gibs shall have fire stops bent and be easily replaceable, without removing doors from hangers. Rubber bumpers shall be provided for door. Replace bronze door edging on door panels and door frames.
Install new astragals. Match the door panels used on elevator no. 2.

2. Provide new door operator header constructed of at least 3/16" thick steel and so shaped to provide stiffening flanges at top and bottom, extending its entire length.

3. Provide new tracks for hangers. Tracks shall be fastened to the header at frequent intervals to insure permanent track alignment.

4. Provide new electrical contacts arranged to operate with the car doors so that the elevator cannot be operated unless the doors are closed or within the tolerance allowed by A17.1.

5. Passenger Restraining Device: Provide passenger restraining devices in conformance with the A17.1 Code, to prevent opening of car door from inside the elevator if the elevator is outside its landing zone.

6. Provide new sight guard attached to leading edge of car door, except where a re-opening device or devices on the car door or car require the omission of the sight guard. The sight guards shall be 0.06 inch thick formed of the same material and finish as the car side of the door.

7. Entrance Wiring: The interlock wiring of all elevator entrances shall conform to the requirements of the A17.1 Code. Termination in the interlock box shall be sleeved with an fire-resistive eyelet or other approved type jacket.

G. **Door Operator :** Provide automatic high speed, heavy duty, closed loop door operators with minimum ½ HP direct current drive motor, fabricated to open and close car and hoistway doors smoothly under all operating conditions for the elevator. Fabricate operating levers of heavy steel members with all pivot points provided with ball or roller bearings. Design operator to withstand, without damage, ordinary reversal of door panels. Affect reversal from intermediate position without delay, operating smoothly, continuously, and without jerk, rebound or slam.

1. **Car and hoistway doors** shall simultaneously open automatically when a car arrives at a terminal to permit egress of passenger(s) whether or not the terminal floor call has been registered in the car and automatically close the doors simultaneously at the expiration of the open timing.
2. **Provide door operators** which are capable of operating doors from closed position to within 3" of "full-open" position at speed of 3 fps. When in "Automatic" operation, close doors at approximate speed of one foot per second after predetermined time interval. Accomplish reversal of direction of the doors from the closing to opening operation, whether initiated by the door edge reopening device, the photoelectric device or the door open button, within no more than 2-1/2" of door movement. Particular emphasis is placed on obtaining quiet interlock and door operation and smooth, fast dynamic braking for door reversals and stopping of the doors at both extremes of travel.

    a. Provide high internal resistance type motor capable of withstanding high currents resulting from stall without damage.
    b. It shall not be possible for the doors to open unless the elevator is within the leveling zone.

3. **Door protection timers** shall be provided for both the open and close directions which will help protect the door motor and prevent the car from getting stuck at a landing. The door open protection timer shall cease attempting to open the door after a predetermined time in the event that the door is prevented from reaching the open position. The door close protection timer shall reopen the doors for a short time in the event that the door closing attempt fails to close the door locks after a predetermined time.
4. **Provide a car call dwell timer** with an adjustable range of from 1.0 seconds to 3.0 seconds. Set the timer at 2.0 seconds. The control circuitry shall be such that with the initiation of the car door detector system, the dwell time shall be reduced over an adjustable range from 3/4 seconds to 1-1/4 seconds.
5. **Provide a hall call dwell timer** with an adjustable range of from 2.0 seconds to 6.0 seconds. Set the timer at 4.0 seconds. The control circuitry shall be such that with the initiation of the car door detector system, the dwell time shall be reduced over an adjustable range from 3/4 seconds to 1-1/4 seconds.
6. **Provide a car call, hall call, coincidence circuit** which in the event an elevator is responding to the same car call and directional hall call, that the hall call dwell time will have precedence. In the event of this condition, the initiation of the car door detector system will not reduce the hall call dwell time.

H. **Infra-Red Photoelectric Curtain**: Provide a new infra-red photoelectric curtain door protective devices consisting of a minimum of 30 beams spaced at even intervals, starting at approximately 2" above finish floor and continuing to approximately 6' above finish floor. The unit is to be housed in a low profile unit, mounted on the car doors and located between the car and hoistway doors. Match other units used in this building.

1. Interruption of the light beams during the door closing cycle shall automatically cause the doors to reopen fully and remain open until the light beam is reestablished. There shall be an adjustable time delay after the doors are fully open and after the light beam is reestablished before the doors start to close.
2. Provide pulsed screen car door protective device projecting across entire entrance opening. Arrange controls to prevent elevator operation if device in not operative. If detector is obstructed for a predetermined, adjustable interval (10 - 30 seconds), sound buzzer and attempt to close doors with a maximum of 2.5 ft-lbs pounds kinetic energy.
3. Fireman's Service: During fireman's service operation the doors shall respond in conformance provisions of the section "Unprotected Entrances" ASME A17.1 Rule 112.5 which states that the doors shall close with 2.5 ft-lbs or less of kinetic force.
4. Nudging Action: Activate if circuit is in original operation. In the event a light beam is continually obstructed for a predetermined time interval (15-17 seconds) after automatic door closing has been initiated, a buzzer shall sound and the doors shall be closed at a gentle, reduced speed. Timers shall be individually adjustable.

I. **Control Panels**: Provide new main/auxiliary car control stations for the elevator. Each station shall consist of a flush mounted faceplate and a metal box containing the operating devices. Each panel shall be mounted in front return panel. Submit drawings and samples for approval. Panels shall be large enough to cover any holes left by the existing panels.

1. Provide all control panels, lights and buttons of the vandal resistant variety.

2. Provide car floor buttons corresponding to the floors served for registration of car stops. Car buttons shall not protrude beyond the faceplate when in the normal position. Call registered LED's, located within or behind the buttons, shall illuminate the button corresponding to the call registered. Match button style with other buttons in other elevators in this building.
3. Exposed buttons and controls shall be suitably identified in conformance with ADA requirements.
4. Provide an alarm button at the bottom of the car stations to ring a bell located in the hoistway.
5. Provide a door open button.
6. Firefighter's Service key switch, cancel button and light shall be located in the main car operating panel only.
7. Engrave car number in each operating panel.
8. Provide a service panel, described below, shown and located where the present service panel is mounted, that contains the following controls:

a. A keyed stop switch., a light switch, and a fan switch.
b. A key-operated Independent Service switch to permit the selection of independent or automatic operation.
c. An audible signal to announce the stopping or passing of a landing served by the elevator.
d. A keyed inspection switch to permit the movement of the car from the hoistway access switches. Keying shall be same as access switch.
e. Key operated car top inspection controls.
f. A keyed security switch which when activated denies access to the 2nd and 3rd floors.
g. Each control device and its operating positions shall be identified by engraved letters on the panel surface as shown.

9. Provide a grounded duplex receptacle.
10. Emergency Telephone/Intercom and Firefighter's Communication System: Provide a telephone and intercom system and Firefighter's Communications equipment as specified in the article "Communications Systems."

2.9 ELEVATOR MONITORING SYSTEM :

A. General Description and Purpose: Provide connectivity including hardware and software to the existing, dedicated computer monitoring system for acquiring, recording and reporting information about elevator operation. The system is capable of detecting elevator malfunctions, gathering statistics, reporting and recording alarms, displaying real-time car status and performing traffic analysis. It is user programmable and field configurable. The existing monitoring system for the building is the CMS System from Motion Control Engineering. It has been confirmed that the present monitoring system license is adequate to support the addition of elevator no. 1 with the monitoring requirements set forth in this specification. Provide a security system linked with the monitoring system. When the key switch in the new control panel is turned to ON, the security system will prevent access to unauthorized personnel to the 2nd and 3rd floors.

1. **System Description**: Distribute the data acquisition, data processing and data recording capabilities of the system, to independent operating nodes or stations. Provide software for a minimum of one (1) Central Station(s) [defined as being connected to a main station via modem connection with appropriate security pass word protection and software in any remote location] and one (1) Main Station [defined as being in or near elevator #1 controller cabinet]. Provide the necessary minimum requirements needed for the Central Station in the Elevator Shop with one existing, personal computer providing data processing and data storage capabilities described below. Equip the controller with exterior access via cable mentioned in this specification. Report information collected and stored at the main station to the Central Stations by periodic communications over a data transmission medium. Report all alarms to a central station printer as described below.

    a. **Operating Systems**: The operating systems shall be MS-Windows XP. Backup software will be provided on a "CD" which shall be readable from both locations. It shall be possible for the user to install or reinstall monitoring system software at any main station or remote station.

    b. **Computer Software (Central Station) Requirements**: Provide, within thirty (30) days of start of construction on the elevator, load and test all necessary software to complete connection and communication between the new main station and the central station.

    c. **Data retention**: The data received by the main station monitoring system shall not suffer any loss or corruption of that data due to power loss to the controller cabinet.

2. **Data Processing (Input) Logic**: User programmable logic shall allow the input signals detected by the system to be combined using these logical operators or their equivalent: "and," "or," "and not," "or not." It shall be possible for the system to delay the recognition of any signal in increments of no more than one second, up to at least 99 seconds. It shall be possible for the user to invert input signals (treat the presence of voltage as the absence of voltage, and vice-versa). It shall be possible to combine at least eight input signals using logic, time delay, and signal inversion, in any combination. The programming which governs the way the system combines inputs to recognize events shall be completely under user control.
3. **User Programmability**: The system shall be user programmable and field configurable. Raw data shall be processed, reported and recorded according to user programmable instructions. It shall be possible for the user to change the way the system processes raw data, to edit the definition of monitored events and to edit the real-time car status display.
4. **Human Interface**: All command options shall be selectable by menu. All system commands shall be via keyboard or mouse. It shall be possible for the user to enter all of the commands necessary for system operation without exiting the monitoring program and without entering DOS commands. All screen prompts and menu selections which are not user programmable shall be in plain English. User programmable messages and descriptions, such as alarm reports, shall also be in plain English - the exact wording of alarms and/or reports to be

proposed by Contractor for approval by the AOC.

5. **Definition of Monitored Events**: It shall be possible for the user to define an event identified by the presence of a particular input or combination of inputs. The user shall be able to control the manner in which an event is reported and recorded.

B. **Central Stations**: Through the security system it shall be possible to edit user programmable features or main station assignments from one (Elevator Shop) central station. It shall be possible to view real-time elevator displays at any main station, to upload main station data files to any central station, and to print reports at any central station.

1. **Central Data Storage**: All of the alarms which are automatically reported to a main station will also be transmitted, printed and stored automatically in the database at the central station. It shall also be possible for the user to selectively upload files from any main station in the system. Uploaded files shall also be stored in the database of the Central Station to which they are transferred and will remain available for report generation until purged.

2. **Real-Time Car Status Display**: It shall be possible to view the current position of the elevator in the hoistway, the status of its doors, the direction of its travel, and other operational parameters by entering keyboard commands at the main station or at a remote station. The information displayed shall be user programmable.

3. **Alarm Viewing and Print out**: Provide capability to report from the main stations to Elevator Shop central station computer and printer all alarm activations. Each alarm report received at a central station will, if designated by the user, (1) appear on the screen, (2) be printed on a printer and (3) sound an audible tone. Each alarm report shall have the following information:

a. Building name
b. Elevator number
c. Time of alarm
d. Name of alarm (Code designation) and type
e. Floor elevator was last located and direction of travel when alarm was activated
f. Definition of alarm
g. Duration of alarm

C. **Main Station (Elevator controller)**: The main station shall have a minimum of six (6) programmable com port connections for connection to a lap top diagnostic computer located on a readily accessible surface of the subject cabinets and capable of diagnostic and report communication. Information shall be stored and accessible through the main station com port via lap top computer. It shall be possible for each individual controller main station to operate independently and to store all of the alarm and statistical data it acquires for up to 30 days. All of the elevator control equipment to be monitored in a machine room shall be monitored by one individual main station. Each main station shall consist of a personal computer. Through the security system it shall be possible to edit user programmable features or remote station assignments from one main station. It shall be possible to view real-time elevator displays at any main station, to upload remote

station data files to any main station, and to print reports at any main station.

1. **Method of Acquiring Data**: Each remote station shall have discrete inputs which shall be connected to test points in elevator control circuitry. The monitoring system's input circuitry shall be generic, capable of detecting discrete AC or DC signals over a wide range of voltages. The system shall be adaptable to controllers made by any manufacturer.
2. **Automatic, Centralized Alarm Reporting**: Each remote station shall be capable of automatically reporting user designated alarms, such as those signifying elevator shutdowns, to one or more main stations (central reporting locations). The medium over which such automatic reports shall be communicated shall be voice grade telephone lines equipped with modems. All reported alarms will be stored in the database at the main station.
3. **Main Station Message Queue**: It shall be possible for the user to program a main station to report alarms to a central station as soon as they are detected or to delay reporting them for a specified length of time. The time delay shall be programmable in minutes and seconds up to at least one and one half hours. The remote station shall be capable of storing at least 400 reportable alarms without reporting them to a main station and without interfering with the normal collection and storage of data by that remote station. The remote station shall continue to function normally, even if the communications link is inoperative or if any or all main stations are off line.
4. **Input circuitry, isolation and breakdown voltage**: The monitoring system shall be capable of safely monitoring safety strings and other critical elevator control circuits. Each and every input to the monitoring system shall be optically isolated. The breakdown voltage rating of the monitoring system's inputs shall be 300 volts RMS or more. The input circuitry shall be designed such that when connected to a relay type elevator controller, no malfunction of the input circuitry can (1) energize a relay on the monitored controller which should not be energized or (2) de-energize a relay on the monitored controller which should be energized.
5. **Number of Inputs**: A main station for a particular machine room shall be equipped with enough inputs to monitor at least 50 points on each elevator controller in that machine room.
6. **General Description and Purpose**:

    a. Each remote station shall be completely enclosed in a locking metal cabinet. The enclosure shall be ventilated and pressurized in order to prevent airborne dirt, carbon dust and other forms of contamination from entering the cabinet and damaging the equipment. The air intake shall be filtered with a removable, washable metal filter.

        I. **Operating Systems:** The operating systems shall be Windows XP with all the latest updates installed. Backup software will be provided on CD ROM disks. It shall be possible for the user to install or reinstall monitoring system software at any main station or remote station.

        ii. **Computer Hardware:** Provide Windows XP compatible personal computers with 32-bit processor with necessary RAM,

keyboard, VGA or higher resolution color monitor, printer and software. Provide a personal computer with appropriate fixed-disk storage devices as required to store data for time periods specified. Provide additional hardware for data acquisition, elevator control interface and elevator control isolation as required. All computers shall be equipped with built-in telephone modems.

7. **Raw Data to Be Acquired**: The inputs at each remote station shall be connected by hard wire to test points or output modules on the elevator controllers to be monitored. The signals monitored on these points will convey raw data to the remote station. The exact points and signals to be monitored will vary with installed elevator equipment and will depend upon manufacturer, type of circuitry and the date of manufacture. A list of signals required to be monitored is as follows:

    1. Raw data acquired for the elevator:

        A. controller power status
        B. hall call power supply status
        C. hall calls registered
        D. fire service
        E. emergency power, auto, manual
        F. programs (up peak, down peak, etc.)
        G. Lobby smoke detector
        H. other smoke detectors
        I. lobby sensor bypass

    2. Raw data acquired for each individual elevator:

        J. Car controller power supply status.
        K. Car position and car direction.
        L. Car run request (advance direction up, down)
        M. Car running status.
        N. Drive run request.
        O. Drive running status.
        P. Car safety string status.
        Q. Gate switch status and door locks status.
        R. Car station stop switch status.
        S. Car in zone (door zone).
        T. Door closed and door open limit status.
        U. Door open failure.
        V. Door closed status.
        W. Doors nudging status.
        X. Door curtain failure
        Y. Final limits status.
        Z. Governor switch status (overspeed).
        AA. Inspection service, independent service status.
        BB. Emergency power (available, selected).
        CC. Load weigh bypass.
        DD. AC overloads and phase failure.

EE. Attendant operation.
FF. Car start failure.
GG. Firefighters' Service phase I.
HH. Firefighters' service phase II.
II. Car at designated floor and car at alternate floor.
JJ. Firefighters' Service door hold open.
KK. Firefighters' Service phase II direction up or direction down.
LL. Car calls registered.
MM. Brake activated.
NN. Car level.
OO. Up normal limit or down normal limit.
PP. Controller cutout switch.
QQ. Light ray or detector failure.
RR. Light ray or detector cutout.

3. Additional items in safety string:

SS. Up final limit and down final limit.
TT. Governor switch
UU. Safety operated switch
VV. Top exit switch
WW. Pit stop switch

4 The exact list of points to be monitored on the elevator will be compiled by the supplier of the remote monitoring system and will be submitted to the Architect for approval.

2.10 **SIGNAL EQUIPMENT**:

A. **Hall Call Stations**: Replace existing hall stations with new hall stations. Provide unit with flat faceplate designed for flush-mounting on wall with body of unit recessed in wall. Hall call buttons shall have illuminated registered directional arrow indicators and shall have their function indelibly, identified on the face plate by engraved symbols complying with ADA requirements. All disturbed surfaces shall be repaired using materials similar to those of adjacent surfaces.

1. **Finish:** Match existing metal and finish.
2. **Mounting Location:** Locate new fixtures positioned with centerline 42" above finished floor.
3. **Button Configuration:** The buttons shall be of heavy and substantial construction with contacts and wearing parts of materials and sizes to meet the severe requirements of elevator service. Buttons shall be at least 3/4 inch in size.
4. **Landings Served:** Provide new hall push-button stations at each landing as described below:

a. Provide 2-button station where passengers can travel either direction; 1-button station where only one direction of travel is available and indicate the travel direction with the arrow direction.

B. **Position Indicators/ Lanterns**: Refurbish the existing position indicators/lanterns.

Replace electrical wiring, bulbs and sockets matching existing units. Replace both broken lenses and intact lenses with new lenses of matching color as existing. Match existing materials and finish. See Redundant Parts par. for additional requirements.
Floor Designations**:** See chart at the end of the specifications.

2.11 COMMUNICATION SYSTEMS

A. General: Provide for the elevator an emergency hands-free telephone, fireman's telephone as described below. All emergency and intercommunication system wiring shall be in accordance with manufacturer's recommended specifications and provided in shielded and filtered conductors to prevent interference as required.

B. Emergency Telephone: Provide a complete Emergency Telephone system. Provide single button, hands-free unit, telephone line powered, auto-dial, and capable of operating with Dual Tone Multiple Frequency (DTMF) as an integral part of the car station. Provide microprocessor controlled unit with no battery required (i.e., the microprocessor will utilize non-volatile memory). Operating range shall cover -20 deg. C to +60 deg. C. Register telephone under FCC Regulations, Part 68 and must comply with NEC 800-1(I) per UL1459. Telephone shall interface with existing systems and shall meet the following requirements:

1. Match cabinet material and finish used in elevator no. 2.
2. Equip telephone with a red emergency push button which automatically connects user to three pre-programmed (auto-dial) locations sequentially activated: the Superintendent's Office, the Elevator Shop and one additional 24-hour manned location. Equip emergency button with approved tactile identification. The emergency push button disconnect shall lockout during the initial calling cycle. Provide a red LED to indicate that the emergency call has been acknowledged. Provide auto-dialer(s) with 20 digit telephone number capacity, programmed to dial the sequential telephone number if the requested number is busy or does not answer. Provide for independent adjustment of speaker volume and microphone sensitivity. Provide three installation tolls and deliver them to the Architect.
3. Telephone shall include the following programmable disconnect options:
    a. LOCKOUT (Line Seizing): Call may only be terminated by the called party.
    b. POSITIVE CONNECTION (DTMF DISCONNECT): DTMF receiver monitors the line until the "#" tone is received from the called party.
    c. BACKUP: Interruption of the loop current when the called party returns on hook.
    d. CALL SAFETY: DTMF receiver monitors the line until a continuous dial tone is detected for 15 seconds.
    e. TIMEOUT (Dial tone disconnect): Independent time out, adjustable from 1 to 15 minutes (1 minute increments).
    f. CALLER DISCONNECT: The calling party may disconnect by depressing this button after the initial time on feature disables.
    g. TIME ON: The 8 - 10 second period where manual disconnection is not possible.
4. Telephone shall be user-programmable. Access to the DTMF programming mode shall require an authorization code number which may be modified by authorized government personnel. The telephone may not contain any mechanical programming devices that may be compromised or changed by unauthorized access to the telephone

enclosure. Provide a written record of the access code to the Architect.

5. Auto Answer: When called from the monitoring station, the telephone shall provide a path for conversation or monitoring (when in monitoring mode, a labeled indicator lamp shall light or flash to inform the car occupant that the monitoring system in use), and provide remote operational verification capability.
6. Auxiliary Output: Provide an isolated auxiliary output terminal to protect telephone circuitry from transient voltage while providing an activation signal for ancillary equipment (i.e., CCTV actuation or security VCR activation).
7. Provide a complete circuit from the cab to the machine room through the car controller to the elevator Communications Terminal with connections described in the Intercom sub-paragraph below.

C. Firefighter's Elevator Communications Equipment: Provide a complete elevator fire communications system. The system and all components shall be listed by an approved, nationally recognized testing laboratory for fire signaling use, meeting all requirements of National Fire Protection Association (NFPA) Standards 72 (1990), except as modified herein.

1. Equipment Qualifications: All components of the system shall be furnished by a single manufacturer, shall be of current design and shall be in regular and/or recurrent production.

2. System Requirements: The system shall function as a common talk, closed circuit, supervised firefighter's telephone communication system. The system shall include, but not be limited to, an approved phone station in the elevator cab, approved fire rated wiring between the elevator and its associated machine room terminal identified in "Life Safety Terminal", and the communications terminal.

3. Physical Requirements: Provide flush mounted remote firefighter's telephone stations identical to those used in elevator no. 2. Equip each station with a hinged door, locked by means of a firefighter's key. Permanently wire handset in place with strain-relieved stainless steel armored cable that will not prevent the phone from being hung-up and cradled. Each handset shall be red high-impact [cycolac]. Equip with a push-to-talk switch, which will signal the master control station**.**

4. Telephone wiring: An additional telephone wire from the firefighter's telephone cabinet in the elevator which is to be clearly labeled, "fireman's telephone spare" at each terminal. Engrave cover plate using a contrasting background with the words "Fireman's Telephone" identical to elevator 2.

PART 3 - EXECUTION

3.1 SITE CONDITION INSPECTION:

A. **Prior to commencement** of equipment installation, examine hoistway and machine room areas. Verify that no irregularities exist which affect execution of work specified.

B. **Do not proceed with installation** until existing work in place conforms to stated project conditions.

3.2 PREPARATION AND PROTECTION:

A. **Protection:** Furnish, erect and maintain catch platforms, lights, barriers, weather protection, warning signs and other items as required for proper protection of the public, occupants of the building, workmen engaged in work and adjacent construction. Multiple hoistway shall be screened from top to bottom during construction. All hoistway entrances under construction shall be barricaded, top to bottom. Barricade plan shall be submitted to the Architect for approval.

1. Provide and maintain temporary protection of the existing structure designated to remain where removal and new work is being done, connections made, materials handled or equipment moved.
2. Maintain adequate fire extinguishers within sight of the work at all times that any cutting or torching operations are performed on the Work.

B. **Debris Containment**: Take necessary precautions to prevent dust from rising by wetting removed masonry, concrete, plaster and similar debris. Protect unaltered portions of the existing building affected by the operations under this Section by dust-proof partitions and other adequate means.

3.3 REMOVAL OF EXISTING EQUIPMENT:

A. **General**: Perform removal and alteration work as indicated, with due care, including shoring, bracing, etc. Be responsible for damage, which may be caused by such work, to any part or parts of existing structures or items designated for reuse. Perform patching restoration and new work in accordance with contract requirements.

B. **Provide means to remove existing** and/or new equipment in the machine rooms. Provide any demolition and repair made necessary by this requirement. Submit the scope/plan of any necessary removal to the Architect for approval before starting work.

C. **Component Deposition**: Materials or items designated to become the property of the Architect shall be removed with care and stored in a location designated by the Architect. Remove such items with care, under the supervision of the trade responsible for reinstallation; protect and store until required. Replace any material or items damaged in its removal to the satisfaction of the Architect. Materials or items removed and not designated to become the property of the Architect or be reinstalled shall become the property of the Contractor and shall be removed from the property.

3.4 ELEVATOR MODERNIZATION:

A. **General:** Install equipment in accordance with Manufacturer's direction, referenced codes, and contract requirements. Install machine room equipment with clearances in accordance with referenced codes and contract requirements.

B. **New Equipment**: Provide required new components and install in accordance with manufacturer's written instructions. Modify new equipment to accommodate existing conditions only in conformance with approved shop drawings.

1. **Fabricate and** assemble various parts in shop to minimize field assembly. Assemble parts which require close field fit in the shop and mark for field erection.

C. **Refurbished Equipment**: Where existing equipment and fixtures are indicated to be re-used, repair such equipment and fixtures and put in perfect working order. Coordinate required refinishing of metals, wood and like material with the Architect.

D. **Clean Existing Components Scheduled to Remain**: Clean the following items of oil, grease, scale, and other foreign matter, and apply one coat of field-applied machinery enamel:

1. **All exposed** equipment and metal work installed as part of this work which does not have architectural finish.
2. **Machine room** equipment.
3. **Neatly touch** up damaged factory-painted surfaces with original paint and color. Protect machine-finish surfaces against corrosion.

E. **Maintenance Provisions**: Install items so they may be easily removed for maintenance and repair; and so that access for maintenance is safe and readily available.

3.5 CLEANING AND PREPARATION:

A. **Work Areas**: Keep work areas orderly and free from debris during progress of project. Remove packaging materials on a daily basis as equipment is installed. Remove all loose materials and filings resulting from work.

B. **Machine Room**: Clean machine room equipment and floor of dirt, oil and grease.

C. **Hoistways:** Clean hoistways, cars, car enclosures, entrances, operating and signal fixtures, and trim of dirt, oil, grease, and fingermarks.

3.6 PAINTING AND FIELD FINISHING:

A. **All equipment and metal work** installed or reused under this contract, which does not have a baked enamel or special architectural finish and which is exposed in the hoistway, shall be cleaned and painted one field coat of enamel. The shank and base of the T-Section of the guide rails shall be thoroughly cleaned and painted one field coat of black metal enamel.

B. **All machine room equipment** shall be painted upon completion of the installation with the manufacturer's standard machinery enamel. Machine room wall shall be painted with

a latex paint and the floor with a enamel paint. The elevator shop foremen will approve the type and color of paint.

3.7 **ADJUSTMENTS:**

A. **Alignment of Guide Rails**: Align guide rails vertically with tolerance of 1/8" in 100'. Secure joints without gaps and file any irregularities to a smooth surface.

B. **Balance Cars**: Balance cars to equalize pressure of guide shoe rollers on rails.

C. **Lubrication:** Lubricate all equipment in accordance with Manufacturer's instructions.

D. **Adjustments**: Adjust motors, generators, brakes, controllers, leveling switches, limit switches, stopping switches, door operators, interlocks and safety devices, etc., to achieve required performance levels.

3.8 **ACCEPTANCE INSPECTIONS AND TESTS**:

A. **General:** Inspection and tests of the installed equipment shall be made in the presence of a representative of the Architect. Perform tests required by ASME A17.1 Safety Code For Elevators And Escalators, with procedures described in ASME A17.2 Inspectors' Manual for Elevators and Escalators. The Contractor shall be responsible for providing the necessary equipment (weights, meters, etc.) to preform any and all tests. Final acceptance shall only be given after all field quality control inspections and tests are complete, all submittals and certificates have been received. Accurate alignment of sheaves will be checked at time of final inspection to insure minimum rope wear.

B. **Required Tests**: Perform the following tests:

1. Door operation and closing force.
2. Capacity tests.
3. Leveling tests.
4. Safety tests.
5. Starting, accelerating, running.
6. Decelerating, stopping accuracy.
7. Equipment noise levels.
8. Signal fixture operation.
9. Overall ride quality.
10. Monitoring system functioning properly.

C. **Test Results**: In all test conditions, obtain specified speed, performance times, floor accuracy without releveling, and ride quality to satisfaction of the Architect.

1. Temperature rise in windings limited to 50 degrees Celsius above ambient. Conduct a full-capacity, one-hour running test, stopping at each floor for 10 seconds in up and down directions, if equipment performance is questionable in the Architect's judgement.
2. Notify Architect 10 days in advance when ready for final review of each elevator. Include a pre-acceptance test report including a safety test documenting the test performed by the contractor and the results.

D. **Performance Guarantee**: Should these tests develop any defects or evidence of poor workmanship, any variance or noncompliance with the requirements of the specified codes and/or ordinances or any variance or noncompliance with the requirements of these specifications, the following work and/or repairs shall be completed at no expense to the Government:

1. Replace equipment that does not meet Code or specification requirements.
2. Perform work and furnish labor, materials and equipment necessary to meet specified operation and performance.
3. Perform and assume cost for retesting required by Governing Code Authority and Architect to verify specified operation and/or performance.

3.9 **INSTRUCTION AND DEMONSTRATION**:

A. **Training**: Provide two (2) separate training sessions, conducted by authorized instructors. Each session shall be four (4) hours continuous duration and conducted during the working hours of 7 AM to 3 PM, Monday through Friday. The Architects' personnel (maximum 10 per class) designated to receive training will be identified to the Contractor prior to the scheduled training. The major topics/ area of instruction shall be addressed in the training sessions are as follows:

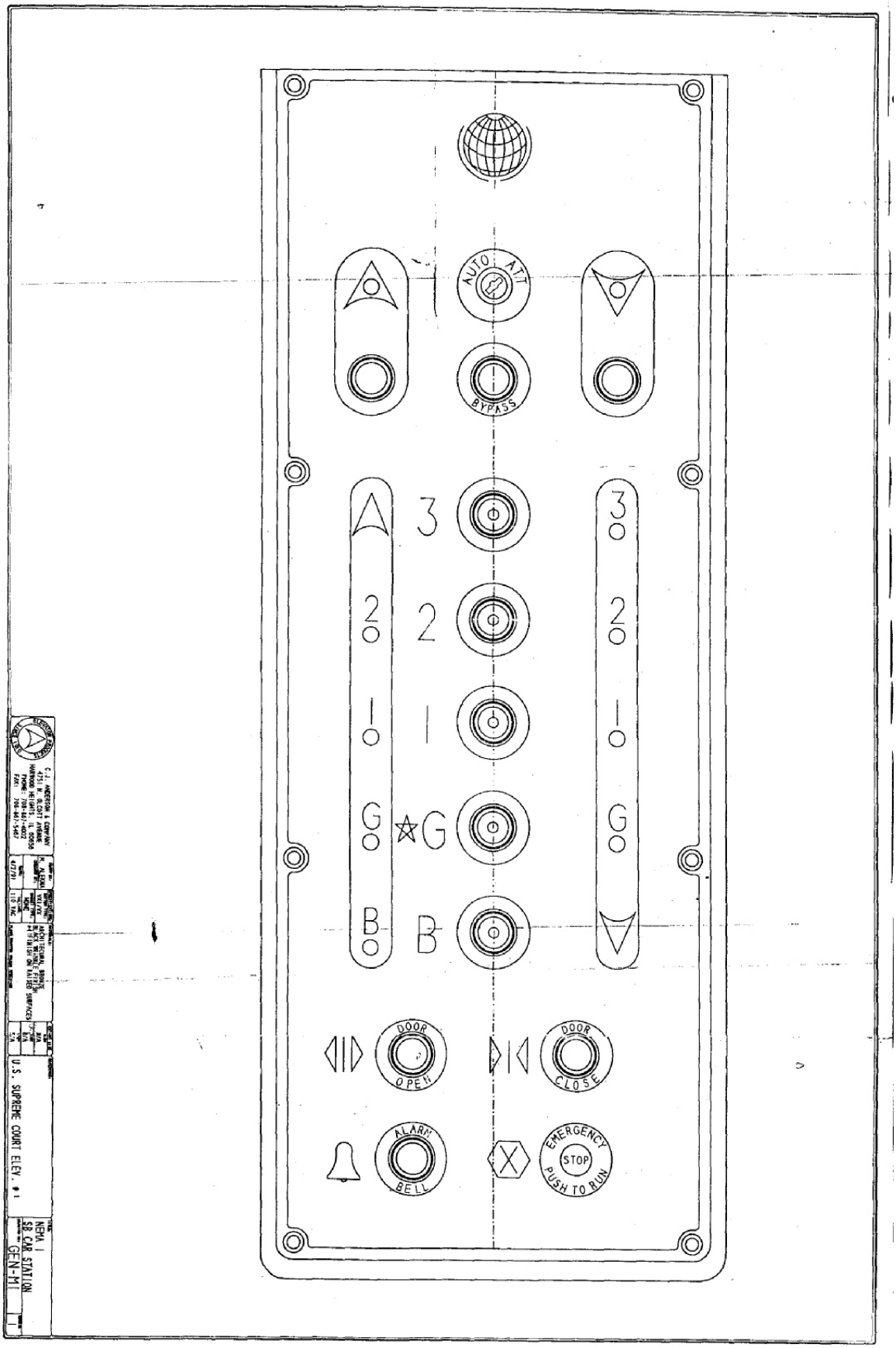
1. Troubleshooting of all the mechanical systems such as the door operators, safety interlocks, safety systems, etc.
2. Troubleshooting of the electrical/electronic control system and subsystems in conjunction with the use of the straight line and schematic diagrams provided by the Contractor.

B. **Scheduling**: Training shall be done on the Elevator after it has been completely finished, tested and ready for turnover to the Architect.

3.10 *Refer to next page for Elevator Schedule.*

3.10 **ELEVATOR SCHEDULE (EXISTING):**

Item / Elevators No.	1
Controller Manufacturer	OTIS
Controls	Manual
Capacity (lbs)	4000
Speed (fpm)	500
Rise (Ft)	66'-2"
Stops/Opening (Front)	5
Hall Buttons (# Risers)	1
Hoist Machine (Type/Location)	Gearless / Overhead
Hoist Machine Power Characteristics (V/A/HP)	240 / 180 / 48
Roping	2:1
Main (Designated) Floor	G
Alternate Floor	B
Entrance Type (Speed/Opening)	Two-Speed / Center Opening
Door Protection	Infra-Red Photoelectric Curtain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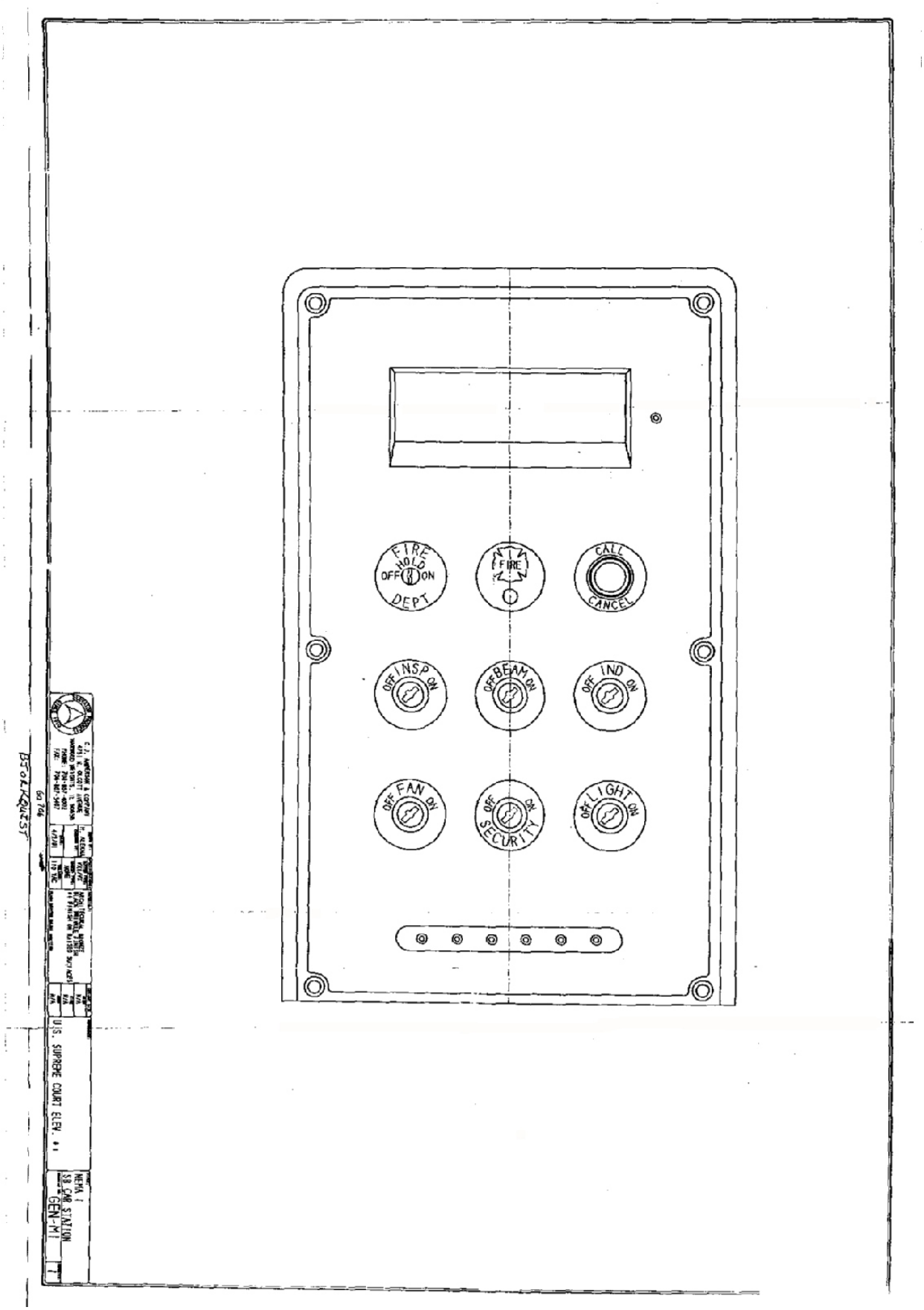
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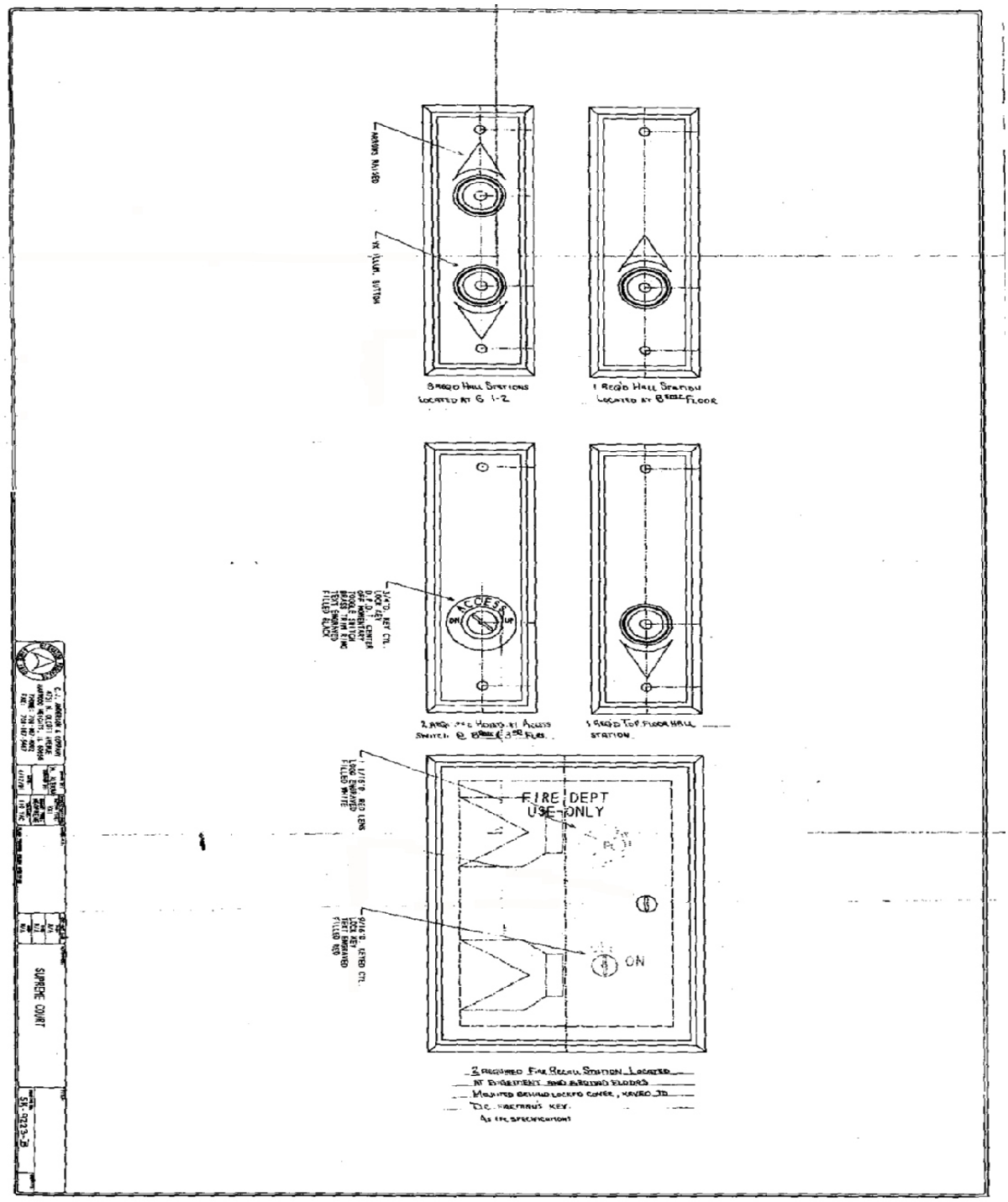
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